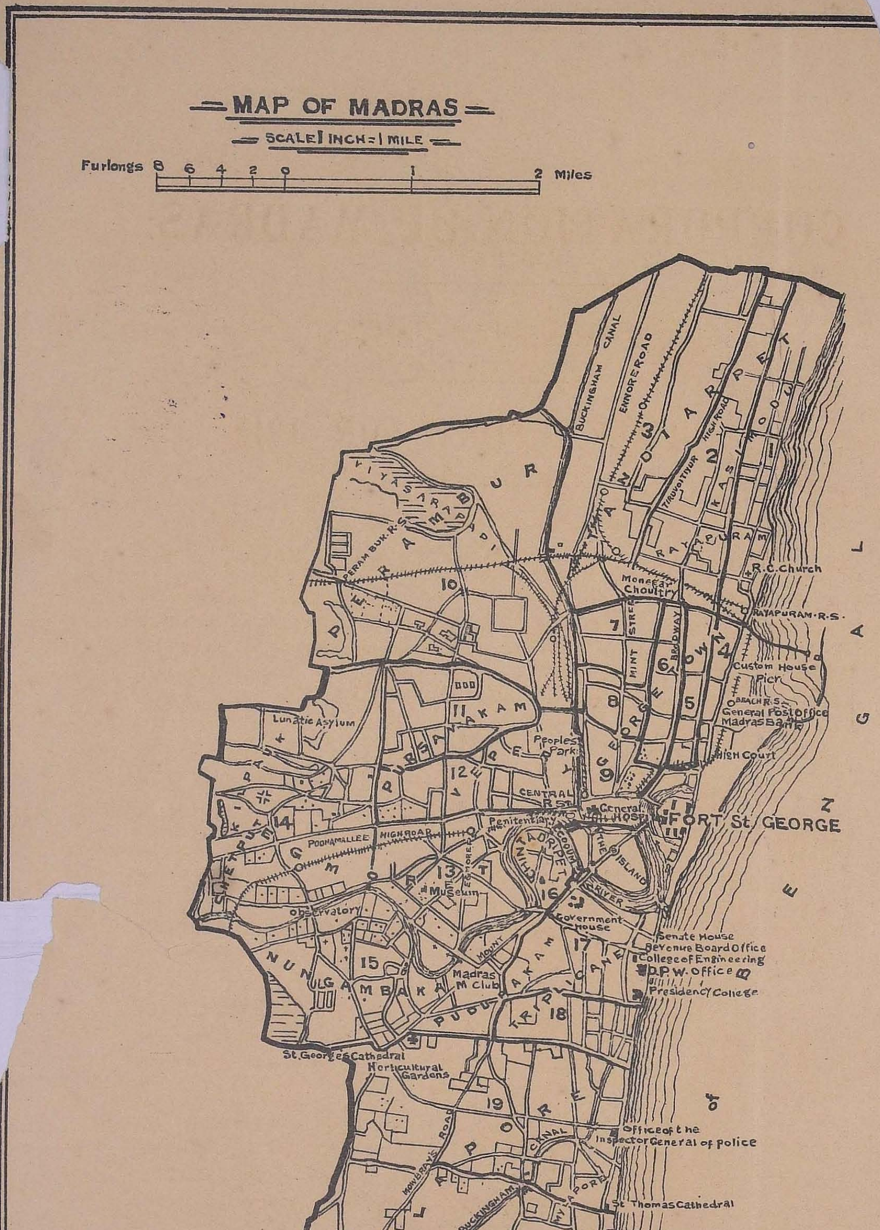

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1917

CORPORATION OF MADRAS

(RIPON BUILDINGS)

ANNUAL REPORT

OF THE

I. Health Department

AND

II. Special Malaria Department

of the City of Madras

FOR THE YEAR

1916

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CORPORATION OF MADRAS.

HEALTH DEPARTMENT.

ANNUAL REPORT FOR 1916

GENERAL INTRODUCTION.

I submit my report on public health in the city of Madras during the year 1916.

2. How far is the Health Department helping to make the city a better and healthier place to live in, is the test by which the work of the department will be judged. How far has the department helped during 1916 to prevent deaths from preventable causes, to protect the city from epidemics, to keep the streets decently swept and cleansed, to provide an adequate and wholesome supply of drinking water, to save the citizen from the dangers of unwholesome food and drink, and to solve the problem of excessive infant mortality ?

3. The following prefatory remarks deal mainly with the work that ought to be done ; fuller details of what has been done will be found in subsequent chapters or sections headed "Vital Statistics," "Sanitation," "Conservancy," etc.

4. Our death-rate was 34·5 *per mille*, the lowest recorded since 1888, when it was 34·1 *per mille*, or, if this year be excepted, the lowest since 1871. Infant mortality was 265·1 per 1,000 births,—the lowest ever recorded ; the birth-rate was 41·8 *per mille*, the highest since 1905 ; for the first time since 1904 the city birth-rate has been higher than the death-rate.

5. From these figures it would appear that 1916 has been the healthiest, or the least unhealthy year since 1897, with a phenominally high birth-rate, and an unprecedently low death-rate, both infantile and general, a sharp epidemic of Small-pox notwithstanding.

6. It is difficult to say exactly to what causes we owe these comparatively good results. I say "comparatively," for our death-rate is still high, the highest among Presidency towns, although when figures are corrected for age and sex constitution, the difference in our disfavour may not be great. The department has discovered no method hitherto unknown of improving public health.

7. Thanks to the energy of Dr. Singaravelu, the streets are cleaner and better now than they used to be ; thanks to our Engineers, a more abundant supply of wholesome water is available ; thanks to a Government grant, a regular anti-malarial campaign has been carried on for some time. But many large problems remain untackled, or at least, unsolved : housing of the poor, milk supply, adulteration of food and drinks, an up-to-date Infectious Diseases Hospital. It may be that we were in one of those good

years which seem to follow a series of bad years, and that our own small efforts have but supplemented natural conditions in bringing about a betterment of the health of the city in general.

Still-Births.

8. The number of still-births recorded during the year was 975 against 650 in 1915 and 606 in 1914. The large and increasing number of still-births must "give us cause to furiously think"; for, an increase in still-births does not merely mean that a few more children died before they had drawn a single breath, but also means in all probability that more mothers have died. Still-birth rate and maternal mortality rate are known to go together, and many anti-natal causes making for a high still-birth rate are just the causes which result in a diminished vitality in the newborn infants and many deaths during the first few days of life.

Illegitimate Births.

9. 1,039 illegitimate births were registered during the year against 951 in 1915 and 818 in 1914; or 4·8 *per cent.*, 5·2 *per cent.* 4·5 *per cent.* respectively of total births. Whether this steady increase in the absolute number of illegitimate births is merely the effect of better registration, or whether it indicates increasing immorality is more than what I can say. But this I do know, that infant mortality among illegitimate children is from two to three times what it is in children born in wedlock. Hence, it follows that a steady increase in illegitimate births will make for an increase in our infant mortality.

Epidemics.

10. The city suffered from an epidemic of Small-pox during the greater part of the year. It was also threatened by Cholera at one time and Plague at another; but happily neither of these diseases assumed epidemic proportions. The total number of attacks and deaths from Small-pox were respectively 1,489 and 476. Cholera claimed 30 victims out of 48 attacked, while Plague attacks and deaths, all imported, amounted to 17 and 11 respectively.

11. By notification, isolation, disinfection, and vaccination we hope to banish Small-pox from our midst. To an improved water-supply, we attribute our comparative immunity from cholera of recent years. But why Madras has hitherto been free from Plague is a question easier asked than answered. The answer at the present time must be a frank "I do not know"; and he must be a very bold man who can see a natural and everlasting immunity in the much-envied freedom from Plague which Madras, alone of all Presidency towns, has hitherto enjoyed. Whatever may be the explanation of our past immunity, it will not do for us to rely on what may have been, after all, a piece of good luck. Fortune is proverbially feeble, and if once our good luck deserts us and Plague is introduced in our midst, the conditions of the city are very favourable for a rapid and disastrous dissemination of the disease.

12. The Madras rat is easily susceptible to Plague, more susceptible in fact than the rats of some places actually visited by Plague. Rat fleas thrive in at least as great an abundance in Madras as in many plague infected towns. As regards our houses and habits, we are second to none in India in the matter of shelter afforded to our rodent friends.

13. I am led to make these remarks on the subject of Plague and its prophylaxis, by the memory of the anxious days between September and December 1916, when our immunity was threatened by the occurence, in quick succession, of an unsually large number of imported Plague cases. I therefore urge on every citizen of Madras that it is not wise to rely on our past immunity, that conditions in Madras are quite favourable to the spread of Plague, if once it becomes indigenous in the City, and that it is high time for us to

realise the aetiological dictum "no rat, no plague" and to set our houses in order. Every house holder owes it to himself and to his neighbour and to the community at large to see that nothing in his particular house tends to form a focus for the dissemination of Plague.

14. Opinions differ regarding the usefulness of a rat destruction campaign. Some urge that a mere thinning in the ranks of rats is in itself of value; others say that rats tend to multiply as fast as or even faster than they are killed. In any case, the destruction of 300 to 350 rats *per* day, the average out-turn of the Corporation rat destruction staff, cannot make any real or appreciable impression on the myriads of the rat population of a vast rat shelter like Madras. Our main hope seems to lie in so building or altering all human habitations, go-downs, granneries, etc., as to make them rat proof so far as may be.

Plague notification.

15. The new "Notification system" is a great improvement on the old "Passport system", in so far as it saves people from the daily worry of attendance at a Pass-port station. But the efficient working of the new system is, by no means, an easy task. So far as experience in Madras goes, evasions are only too easy. The majority of our plague patients and contacts, who came in, as they did, from infected localities, had no notification slips; nevertheless, they had obtained rail tickets at Railway stations notified under the Plague Regulations. It is not humanly possible for a booking clerk to exercise the necessary vigilence in the few minutes prior to the arrival of trains, during which, at most Stations, tickets are issued. Furthermore, some time invariably elapses between the outbreak of Plague in any locality, and the declaration of the place as an infected area; and perhaps some more delay occurs before notification is started at the nearest Railway station. During this interval there is nothing to prevent a person from such an infected area travelling to Madras without any notification at all: and it is a matter of common experience that many people leave an infected place simply to avoid Plague restrictions. To prevent such evasions, I strongly urge the institution of a Notification-checking-station at Basin Bridge, where notification slips can be checked simultaneously with tickets, and fresh slips issued to all persons coming from infected areas without notification papers.

Malaria.

16. The epidemic of Malaria which broke out in 1912 seems to be well on the decline, the number of attacks reported from the several hospitals and dispensaries in the City during the year under report being 28,933, against 41,938 in 1915, 45,692 in 1914, 40,088 in 1913 and 20,512 in 1912. Some may attribute this to "natural decline", whatever that may mean. "Every "disease that is born must die. Malaria has lived and is bound to die, antimalarial "measures, or no anti-malarial measures." I cannot prove that it is *not* so. But I may point out that while Malaria is generally prevalent throughout the Presidency, a steady and decided decline is observable just in those areas where a regular anti-malarial campaign has been carried on, namely, Ennore and Madras. "No mosquito, no malaria" is the dictum on which all anti-malarial measures are mostly based. But besides Malaria, some diseases are definitely known, and some are suspected, to be communicable to man by the agency of certain varieties of mosquitoes. To mention only a few of such, mosquitoes are reasonably suspected of the propogation of Elephantiasis, Dengue, Seven days' fever; the Yellow fever of America (nearer to us than ever—now that the Panama Canal is open) is definitely known to be transmitted by the 'Stegomyia' mosquito.

17. It therefore follows that considered from the prophylactic standpoint of the sanitarian, anti-malarial campaigns, including as they do, all measures, that are calculated to keep down mosquito life, directly by the use of larvicides, or indirectly by removing all their potential breeding places by drainage, reclamation of disused wells, tanks, etc., are of use not only against Malaria, but also against many other diseases.

18. Sanitation in India is largely a matter of anti-malarial measures. If it is necessary to have permanent establishments for protecting the citizen against Small-pox, for keeping his streets swept clean, for looking after his drains and sewers, for providing pure and wholesome water, I venture to think that the case is as strong for a permanent establishment to protect the citizen from the dangers of mosquito-borne diseases. In other words, a continuing anti-mosquito campaign should form a definite and permanent feature of the Sanitarian's programme in Madras.

Infectious Diseases Hospital.

19. An adequate Infectious Diseases Hospital for the City is long overdue. The lack of such provision was felt very keenly during the recent epidemic of Small-pox. More than once, we have selected sites, planned, estimated, replanned and re-estimated and then done nothing. We have again planned and are again estimating ; but let us hope that this time at least our plans and estimates will materialise into something substantial.

Infant Mortality.

20. Infant mortality is a big and complicated problem. The main factors at the root of the evil are "dirt, disease, destitution, drink," generally speaking "the devil"; ignorance is decidedly a devil to be overcome. A Corporation cannot vanquish these devils with a wave of a magic wand. By its conservancy and sanitary services the Corporation fights dirt and disease ; in some directions it can hope to grapple more directly with the problem of infant mortality. The main lines of such effort are :—

1. The training of an increased number of midwives for employment by the general public.

2. The advising of mothers as to their own health and that of their children by official and non-official visitors.

21. The first of these methods, the training of midwives, the Corporation has for some years essayed at its Lying-in-Hospital, Royapuram. The scheme of Health Visitors or of a Municipal Nursing system, the Corporation now proposes to attempt. The scheme as proposed is a very modest and unpretentious one. It is to be mainly a maternity service, but secondarily a Health-visiting scheme. Advice to mothers regarding the infant and maternal hygiene is very good. But how can a woman of the cooly class make use of our advice ? She may perhaps listen dutifully to our counsel regarding the use of good milk, good food, rest, at least, during the later months of pregnancy. Good milk cannot be got for the asking, if it can be got at all in Madras, nor good food bought for nothing. As for rest, she cannot think of it in the face of her poverty, and the need to earn each day's food. Hence, mere advice from Health Visitors is not calculated to be of any great effect one way or the other. But midwifery service is not in the same category. Being something more real than mere advice often impracticable, it should be welcomed, especially if supplemented as in Bombay, by some provision for supplying the needy and the indigent with certain necessaries, such as warm clothes and wholesome milk. In the making of this provision lies ample scope for private charity. In our proposed scheme, all the staff are to be Indians. A good working knowledge of the vernaculars is essential. It may be a startling assertion to say that an

Indian born may not possess a competent knowledge of at least his or her own vernacular. But the fact is so. Our Lady Superintendent of Health must be able to give clear professional advice without the introduction of foreign words unintelligible to the persons whom she is addressing.

Sanitary Conscience.

22. Whether we are considering measures of sanitary reform in general, or those measures directed against infant mortality in particular, we frequently find that ignorant opposition stands in the way of our carrying out beneficial sanitary reforms. No programme of sanitary reform can be a success, unless it has the willing co-operation of those for whom it is intended. If a sanitary regulation is such that it cannot be maintained except by constant compulsion, then it is very likely that the regulation is bad, or if good, at least, premature. In any case, such a procedure can never be of real or lasting value. Because of their ignorance, our masses not only see no good in the sanitary reforms proposed by us primarily for their benefit, but actually discover overt or veiled oppression in each and every action undertaken by the sanitary authorities. Hasty compulsion under such circumstances may easily make a bad feeling worse. Compulsion is a last resort; it should be preceded by many efforts at persuasion and other explanation. I have vivid recollections of numerous occasions, and I cannot recall them without a feeling of thankfulness during the recent epidemic of Small-pox and the threatening of Plague, when this policy was more successful than any show of authority or prosecution could ever have been.

23. To the simple uneducated Madrasee, the death of his infant from, say, Infantile Diarrhoea or Small-pox is the dispensation of an inscrutable providence which nothing could prevent. If anybody tells him that insanitation and overcrowding are among the causes of infant deaths, he can only pity the maker of such unmeaning suggestions. If one dare to go further and require owners to improve buildings in congested " slum " areas, there is sure to be the cry of " Municipal high-handedness ": the poor, ignorant slum-dweller and the rich " educated " slum-owner are both up in arms. The slum-dweller *cannot* see why such and such a step is necessary, because of his ignorance; the slum-owner *will not* see the necessity, because of self-interest. Of course, there are honourable exceptions. But, for the great part, the sanitarian has to contend against the ignorance of the masses and the self-interest of the classes.

24. What is the remedy? The invariable answer is " Education." Let us have Education by all means, but " Education " must be something more than a smattering of the three " R's ". Many a well-to-do man, who reads and writes to admiration, enjoys the profits of a reeking slum without a twinge of conscience; many a servant, who in his daily accounts evinces a genius for figures, lives contentedly amid filth. I plead for instruction in practical commonsense cleanliness not in chimerical abstractions at our Corporation schools.

Milk Supply:

25. It has been pointed more than once that an adequate supply of wholesome milk at reasonable prices is the crying need of Madras, and that this need affects alike the infant struggling to grow up and the middle aged citizen of Madras, of whose daily dietary, milk, in some form or other, forms part. There is a wide field here for private and co-operative enterprise, and a properly maintained dairy certainly ought to pay in Madras. Every one is weary of the wiles of the average Madras milk vendor.

26. Many of the cow houses of the City are highly insanitary and situated in the vicinity of living rooms. The Corporation have built a model cattle-yard where

cow owners can keep their cows at nominal rents. Although we have got about 90 heads of milch cattle into the yard, it is not yet a popular institution. No one will buy milk drawn at the yard and transported into the City; this distrust of the milkman is not unnatural. What is needed is an agency which people will trust to transport milk without adulterating it.

Housing problem:

27. Our housing problem is acute, mainly because, of the lack of cheap communications. It is in our congested localities that many of the Schools and Colleges, Public offices, and Private firms, Banks, etc., are situated. Poverty and paucity of communications force a large number of students, clerks and others to herd together in the neighbourhood of their daily work. As I suggested on a previous occasion, large employers of labour might help in the solution of this problem by building sanitary dwellings for their poorer servants. Extension of the tramway service to the suburbs and the speeding up of such services as exist would go a long way towards mitigating the evils of the present situation. Failing tramway service, the railways may step in. The new Municipal Act contemplates schemes of town-planning and town-extension; but in a City like Madras, which is proverbially a City of distances, no planning of suburbs, unprovided with tram or train service, will benefit the ordinary citizen.

Food and drugs

28. Here we are hampered by the want of a Municipal Laboratory and Analyst; and until legislation improves our finances we are not likely to possess either of these conveniences.

Water-supply.

29. Water-supply continued to be fairly good throughout the year. There were no breakages or water famines except on one occasion when, as an experimental measure, water was supplied lavishly at a very high pressure. A couple of pipes gave way, but, as such a possibility had been anticipated and provided for, no serious shortage of water-supply resulted.

Conservancy and Drainage.

30. Motor lorries have been of great service in the matter of conservancy, and arrangements have been made to extend the motor service throughout the City. There were happily no strikes among the sweepers and drivers nor any shortage of labour. But it has to be recognised that the work is disagreeable, and as education and enlightenment filter down to the depressed classes, as they are bound to do, recruitment of this class of labour is sure to become increasingly difficult. The replacing of the trenching system by the establishment of pail depots and the general introduction of flush-out latrines are reforms calculated to be of great use in meeting a probable shortage of scavengers. Underground drainage works are progressing, though the financial troubles of the war have slowed down the rate of progress. But to obtain the best results, it is essential that improvement of drainage arrangements inside houses should keep pace with improvement in the public sewers. Here, as elsewhere, co-operation of the citizen with the Corporation authorities is necessary. Sewage will flow into the public streets if houseowners allow the syphons connecting their house-drains to the sewers to be blocked with bits of cloth, paper, wooden balls, stones, leaves, etc., etc.

Vital Statistics.

31. A distinct improvement was observable in the department of Vital Statistics; thanks to the co-operation of medical men, and to the better working of our Medical Registrars. But registration is capable of further improvement. With the institution of Midwives—Health-Visitors, it is hoped that registration of births will be better done. As regards registration of deaths, suggestions have been made on a previous occasion for the introduction of a system of paying a small

fee for every case of death certified by a Medical Practitioner. Under the new Municipal Bill, the Commissioner may pay a fee not exceeding a rupee, for each notification by a Private Medical Practitioner of any "dangerous disease" under his care. The correct registration of vital statistics is vital to the due discharge of the duties of a Medical Officer of Health, it is to these vital records that he must appeal again and again to measure and check his work. Every citizen of Madras starts his career as a "Vital statistic" in the Corporation register of births; and the last that is known of him on earth is when the Corporation enters him still as a "Vital statistic" in its weekly mortality column.

Conclusion.

32. In conclusion, I shall be failing in my duty if I do not thankfully acknowledge the valuable services rendered by my colleagues, the three Assistant Health Officers, and by the entire staff of the several sections of the Health Department who have all worked to my entire satisfaction. In particular, I desire to record my appreciation of the specially good work done during the year under report by the Medical Vaccinators, and by the clerical staff of the Vital Statistics section.

CORPORATION OF MADRAS,
20th July, 1917.

K. RAGHAVENDRA RAO,
B.A., M.B. & C.M.,
Acting Health Officer.

STATISTICS FOR 1916

1.	Area of the City	...	27·6 sq. miles
2.	Census of 1911—		
	Population	...	5,18,660
	Average density	...	29·4 *per* acre.
	Density of the 7th, 8th and 9th Divisions	...	132·6 *per* acre.
	Inhabited houses	...	59,595
	Number of persons per house	...	8·6.
3.	Total births registered in 1916.		
	Excluding still births	...	21,675
	Still births	...	975
	Illegitimate births	...	1,037
	Birth-rate	...	**41·8**
4.	Total deaths registered in 1916	...	17,872
	Death-rate	...	**34·5** *per mille.*
	Infantile mortality	...	5,746
	Infantile mortality rate	...	**265·1** deaths *per* 1,000 infants born alive in the year.
5.	Estimated population for the middle of the year 1915	...	5,22,617
6.	Death-rate from infectious diseases.		**18·3** *per mille.*
7.	Death-rate on estimated population.		**34·2**.

CORPORATION OF MADRAS.

PART I.

Report of the Health Department, for the Calendar year 1916.—Detail.

Office.

I continued to hold the office of the Acting Health Officer during the year under review. Dr. C. Singaravelu Mudaliar, L.R.C.P., and L.R.C.S., the Senior Assistant Health Officer continued to be in charge of the conservancy work of the whole city; while Dr. Raman Pillai, and Dr. Isaac were in charge of the South and North ranges of the City, respectively. Dr. Raman Pillai was on sick leave for four months from 8th March 1916 and his work was carried on by me and Dr. Isaac without a substitute being appointed.

The administration of the Health Department is, as in previous years, divided into five sections, namely,

1. Vital Statistics.
2. Sanitation.
3. Conservancy.
4. Vaccination.
5. Plague.

A detailed report of the working of each of the above sections is made in the following pages :—

In view of the fact that I also occupied the post of the Special Malaria Officer a report of the administration of the Special Malaria Department is included in Part II of this volume.

1. VITAL STATISTICS.

The Vital Statistics section continued to be under the supervision of Dr. Raman Pillai, and Dr. Isaac, the Assistant Health Officers in charge of South and North Ranges respectively, during the year 1916.

Table A shows the birth and death statistics for 12 years since 1905.

TABLE A.

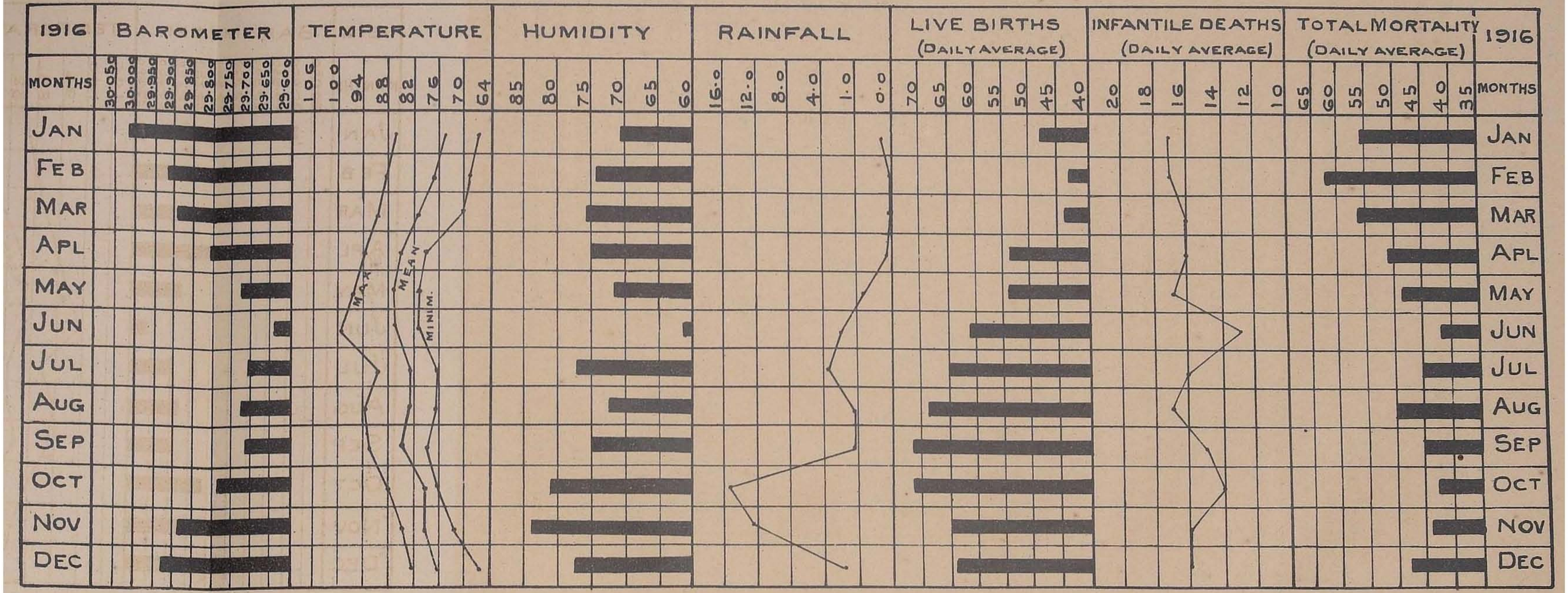
Comparative Statement of deaths from some of the Principal diseases during the past 11 years.

—	No. of Live-births registered.	Birth-rate *per mille* excluding still births.	No. of deaths registered excluding still birth.	Death-rate *per mille.*	Small-pox.		Malaria.		Other Fevers.		Other infectious disease.		Plague.		Diarrhoea and Dysentery.		Respiratory Diseases.		Infantile Mortality under 1 year.		Deaths from children between 1 to 5 years.		Still-Births.
					Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.
1905 ...	23263	45·6	30060	59·0	329	0·6	818	1·6	4137	8·1	4273	8·4	22	0·04	6913	13·5	1539	3·0	7259	316·3	4989	109·9	1005
1906 ...	18608	36·5	23749	46·6	620	1·2	2928	5·7	1149	2·3	986	1·9	56	0·1	5704	11·1	1490	2·9	6350	341·2	4009	88·4	736
1907 ...	19808	38·8	20638	40·5	49	0·09	2640	5·1	1688	3·3	960	1·9	3	0·005	4466	8·7	1260	2·5	5364	270·7	3467	76·5	845
1908 ...	19980	39·2	22285	43·7	13	0·02	2756	5·4	1981	3·9	1621	3·2	2	0·004	4225	8·2	1508	3·0	5922	296·3	3196	70·5	730
1909 ...	18981	37·2	19354	37·9	68	0·1	2514	4·9	1900	3·7	484	1·0	3	0·005	3701	7·2	1648	3·2	5600	295·0	2605	57·5	743
1910 ..	19340	37·9	20312	39·8	116	0·2	2376	4·6	2742	5·4	1066	2·1	5	0·009	3635	7·1	2173	4·3	5687	294·1	3059	67·5	673
1911 ...	19735	38·3	21771	42·0	480	0·9	2884	5·6	1163	2·2	1482	2·9	3	0·005	4854	9·4	3011	5·8	6027	305·4	3233	73·7	665
1912 ...	20099	38·8	20132	38·8	106	0·2	2934	5·7	999	1.9	927	1·8	1	0·002	4897	9·4	2671	5·2	5628	280·4	2951	67·2	674
1913 ...	19470	37·5	20675	39·9	34	0·06	2788	5·4	1043	2·0	1232	2·4	3	0·005	5193	10·0	2700	5·2	5713	293·4	3296	75·1	642
1914 ..	18241	35·2	24174	46·6	66	0·1	2658	5·1	786	1·5	2306	4·4	2	0 004	5508	10·6	3762	7·3	5635	308·9	3740	85·2	606
1915 ...	18331	35·3	18688	36·0	92	0·2	1686	3·8	644	1·2	558	1·1	...	...	4208	8·1	3062	5·9	5244	286·1	2748	62·6	650
1916 ...	21675	41·8	17872	34·5	476	0·9	763	1·5	528	1·0	443	0·9	11	0·02	3664	7·1	3727	7·2	5746	265·1	2742	62·5	975

Diagram

of

Daily Mean Births, Deaths and Climatic Conditions in Madras City During the Several Months of 1916.



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1917

Climate.

The climatic conditions during 1916 were on the whole very satisfactory. The total rainfall recorded during the year was 46·47 inches against 56·61 in 1915 and 56·63 in 1914. Table B below shows the quarterly rainfall in the City since 1911, rain fell on 92 days ; the largest number of days (18) in a month during which there was rainfall, was in November and the lowest, in the months of January to April. The months of February and March had no rainy day while there was one day's rain each in the months of January and April. The heaviest rainfall was in October being 15·30 inches against 20·79 inches in November 1915 and 19·22 in October 1914.

The summer months were not so severely oppressive as in previous years. The hottest part of the year was from April to August, during which the highest maximum and minimum temperatures were 104·7 and 85·6, respectively on one day in June ; the highest mean maximum and minimum temperatures were 99·8 and 80·7, respectively.

The winter months were much cooler than usual in this City ; maximum and minimum temperatures during the months September to December varied between 89 and 69·7, these being the highest and lowest recorded.

TABLE B.

Year.	1st Quarter. January to March.	2nd Quarter. April to June.	3rd Quarter. July to September.	4th Quarter. October to December.	Total.	Remarks.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	
1911	...	0·64	10·92	24·97	36·53	
1912	2·83	1·78	8·97	33·11	46·69	
1913	0·14	2·29	6·84	55·78	65·05	
1914	1·06	2·70	18·85	34·02	56·63	
1915	10·15	2·19	20·43	23·84	56·61	
1916	0·04	4·27	8·78	33·38	46·47	

Registration of Births and Deaths.

The Medical Registrars were in charge of Registration of Births and deaths. The number of Conikapillays employed was 20 as in the previous year ; these men were under the direct control of the Medical Registrars of the respective Divisions. Births are traced by Conikapillays by house to house enquiry in their Divisions, and by enquiry of midwives. Reported causes of deaths are verified by Medical Registrars by interrogating the relatives of the deceased, by soliciting information by letter, and by personal interview with the Practitioners, who treated deceased.

Births.

The number of births registered during the year 1916 (exclusive of still births) was 21,675, this being 3,344 births in excess of the births during 1915. The ratio calculated on the Census population of 1911 was

41·8 *per mille* against 35·3 in 1915 and 35·2 in 1914. The birth-rate calculated on the population estimated in the middle of 1916 was 41·5.

The above calculation shows only the crude birth-rate on the total population according to Census of 1911. This is a fairly satisfactory method if used for comparison of the rates from year to year for the same community, or for different communities known to be nearly identical in age and sex constitution, and in conjunction with the death-rate it is sufficient to measure the natural increase in a population. But in as much as it does not come into account the constantly changing constitution of the population with reference to age, sex, condition of marriage, this method cannot be adopted for purposes of comparison over a long series of years.

It is therefore desirable to compare birth-rates calculated on the number of possible mothers or married women at child-bearing age, or even on the total married female population. Such calculations are by far the best means of comparing the birth-rates of different Indian Cities.

Thus the birth-rate shown in the Table C given below calculated on the number of possible mothers—all married women—works out to 219 *per mille* in 1916, against 186 in 1915, 185 in 1914 and 172 for 1911, and still the highest for the Presidency town for several years. Madras compared with Bombay and Calcutta stands easily first in this respect.

TABLE C.

Year.	Per 1,000 of total population.			Per 1,000 married females of all ages.			Per 1,000 women between 15 and 45.		
	Madras.	Bombay.	Calcutta.	Madras.	Bombay.	Calcutta.	Madras.	Bombay.	Calcutta.
1914	35·2	20·09	19·4	160	106·82	129·9	185	122·64	160·5
1915	35·3	20·47	18·5	161	109·12	123·9	186	125·29	153·0
1916	41·8	21·62	20·9	190	115·26	140·0	219	132·33	172·9

The corresponding figure for England and Wales for the same census year 1911 is stated to be 196; this is very interesting, as showing that the fertility of the average Indian woman is not, as is commonly imagined, higher than that of the average English woman. This fallacious impression is doubtless due to the fact that calculations of birth-rates on total population makes no allowance for differences in the proportion of married and possible mothers between a community like the Indian, where marriage is almost universal among women, and a community like the English, where a good many women remain unmarried.

The fallacy of estimating birth-rates on total populations is also illustrated by a comparison of the birth-rates of Madras, with those of Calcutta and Bombay. Compared with Calcutta and Bombay, Madras always shows a high crude birth-rate; the reason becomes apparent from a study of the sex constitution of the population of the three

towns. Bombay and Calcutta are large industrial centres, with a large preponderence of males over females ; in Madras the sex distribution is very nearly equal, as the following table D shows :

TABLE D.

Madras.		Bombay.		Calcutta.	
Males.	Females.	Males.	Females.	Males.	Females.
2,66,465	2,52,195	6,40,288	3,39,139	6,01,674	2,88,393

The real explanation of our high crude birth-rates lies in the fact that Madras has relatively a larger number of females (and possible mothers) than Bombay and Calcutta. If we calculate births on the number of possible mothers, the disparity becomes less marked.

There are certain causes which tend to vitiate the correction of our birth records :

First, non-registration of births from neglect, or ignorance on the part of parents, relatives and friends. To correct errors arising thus, Conicapillays make house to house enquiries.

Secondly, a certain number of children really belonging to the city are born outside and come to the city a few months later. These do not usually come to our notice until they come of age for vaccination.

Thirdly, there are yet other births, not registered, and discovered only when the babies in question die, and the puzzled Medical Registrar finds that there is no record of the birth of the baby or babies reported to have died.

Table E gives statistics of births in Hospitals :

TABLE E.

Name of the Institution.	1914.	1915.	1916.
Government Maternity Hospital	1,688	2,033	2,542
Rajah Sir Ramaswami Mudaliar's Lying-in-Hospital ...	897	935	1,297
Victoria Caste and Ghosha Hospital	515	598	753
Christiana Rainy Hospital	141	206	332
Kalyani Hospital	92	111	200
Station Hospital, Fort St. George	1	2	4
Leper Hospital	...	2	...
The Penitentiary	...	1	1
Health Home (Miss Bennet's Hospital)	...	...	13

Births by Race.

Table F shows birth-rate by races; and Table G, that amongst the principal sub-divisions in the Hindu Community for three years. The Muhammadan community shows the highest birth-rate of 44·0 *per mille,* the European community shows the lowest. The Hindus remain practically steady, while the Indian Christians show a distinct increase.

TABLE F.

Table of birth-rate for the different races of the city for 1914, 1915 and 1916.

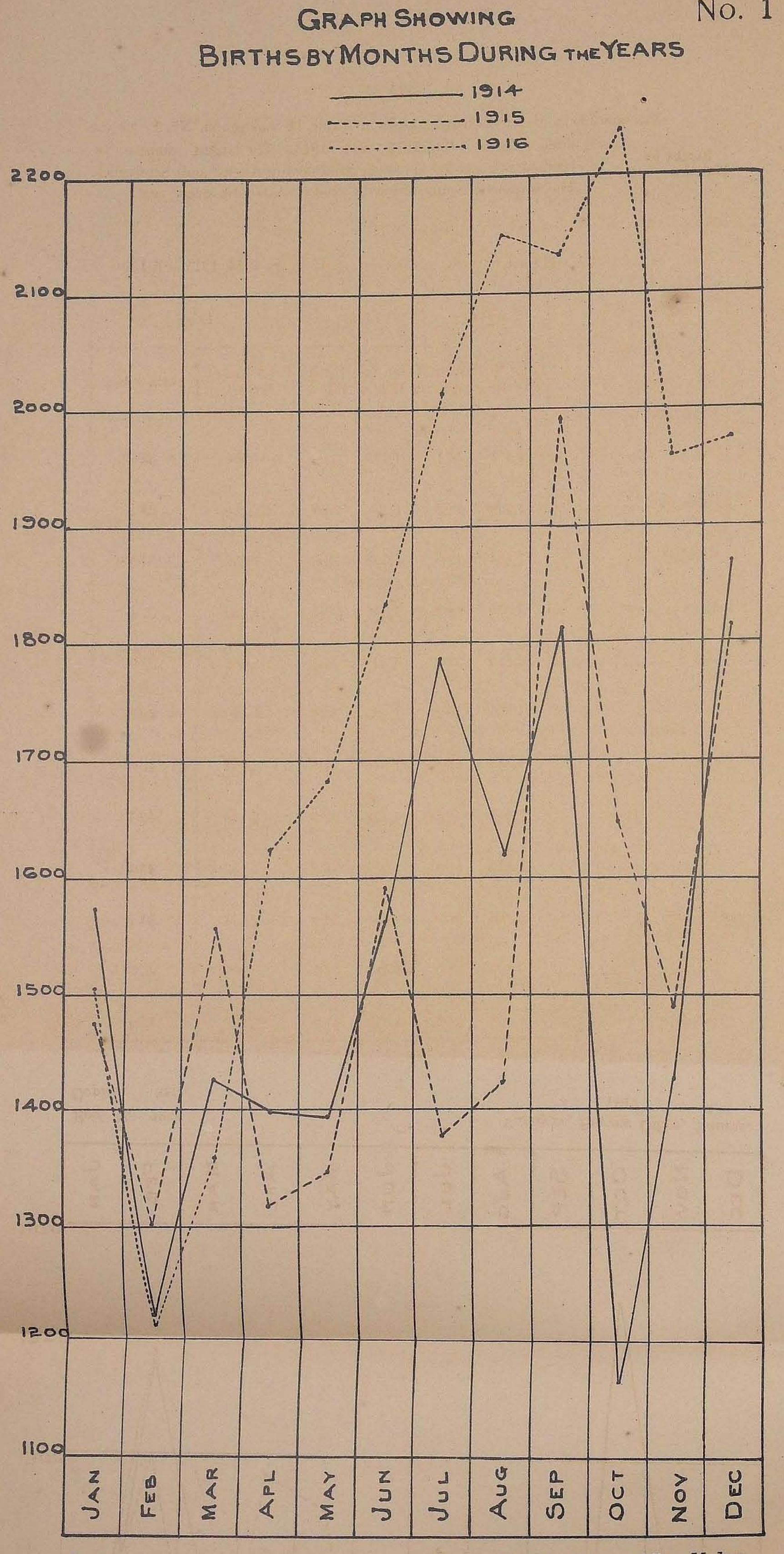
Race or caste.	Population by the census of 1911.	Birth-rate for 1914.	Birth-rate for 1915.	Birth-rate for 1916.
Europeans ...	4,187	18·2	20·1	23·8
Anglo-Indians ...	10,332	38·2	34·4	36·4
Indian Christians ...	27,293	30·1	35·2	39·2
Hindus ...	4,15,910	35·3	35·5	42·1
Muhammadans ...	59,169	38·7	36·5	44·0
Others ...	1,769	1·1	0·6	1·1
Total ...	5,18,660	35·2	35·3	41·8

TABLE G.

Table showing the total number of Births of the Principal Sub-divisions of the Hindu Community and Percentage calculated on the Population of each race for three years from 1914 to 1916.

Principal Sub-divisions of the Hindu Community.	Population (census 1911).	1914.		1915.		1916.	
		Total Births.	Birth-rate.	Total Births.	Birth-rate.	Total Births.	Birth-rate.
Brahmin	32,727	746	2·28	854	2·61	924	2·82
Chetty	36,414	961	2·64	1,319	3·62	1,245	3·41
Vellalah or Mudaliar ...	66,551	2,121	3·19	2,376	3·57	2,614	3·93
Balijah or Naidu ...	47,811	1,563	3·27	1,474	3·08	1,672	3·50
Vanniah or Naicker ...	50,209	1,494	2·98	1,559	3·10	2,428	4·84
Pariah	59,651	2,107	3·53	2,167	3·63	2.784	4·67
Pattnavar	9,799	499	5·09	624	6·37	442	4·51
Yadaval or Idayar ...	14,308	488	3·41	815	5·69	611	4·27
Visva Brahmin or Kammalars.	15,626	582	3·72	897	5·74	708	4·53

No. 1



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1917

CORPORATION OF MADRAS.

Health Officer's Administration Report for 1916.

ADDENDA Et. CORRIGENDA.

On page 11	Registration of births and deaths	last line	Insert "the" between "treated" and "deceased."
" 12	last para	*1st* "	omit "s" in populations.
" 16	"	*6th* "	*for* "shows" *read* "show."
" 16	"	last "	*for* "Dysentry" *read* "Dysentery."
" 20	last but one para	*4th* "	Insert "763" before "persons."
" 26	1st para	*5th* "	*for* "sections" *read* "section."
" 26	Measures to combat the diseases	*3rd* condition	*for* "annoint" *read* "anoint."
" 28	In 2nd para "The amount of protection, &c., conferred by small-pox"		substitute "vaccination" for "small-pox."
" 30	para 1	line 8	*for* "follws" *read* "follows."
" "	plague		*for* "death-rate being 0·02" *read* "death-rate was, etc."
" 31	para 3	head line	*for* "dysentry" *read* "dysentery."
" 33	para 1	line 2	*for* "throught" *read* "throughout."
" "	"	last line	*for* "unhealthness" *read* "unhealthiness."
" 39	last para	line 4	*for* "cause" *read* "course."
" 44	para 1	line 3	*for* "1914." *read* "1915"
" "	para 3	head line	*for* "death" *read* "density."
" 46	para 2	line 1	*for* "and" in sections 218 and 221. *read* "to"
" 48	para 7	last line	*for* "acceeded" *read* "acceded."
" 49	para 3	line 7	*for* "inlit" *read* "in it."
" 52	para 6	line 3	*for* "carying" *read* "carrying."
" 56	"	"	Insert "more" before "serious."
" 78	In the heading of Annual Form No. I-A.		*for* "date" *read* "data."
" 115	last para	line 2	*for* ; "A" *read*, "a."
" 120	In 'Petrolising' para 2	line 4	*for* "fills" *read* "gills."
" 121	last para	last line	*for* "Howtharn" *read* "Hawtharn."
" 126	para 1	line 5	*for* "Informity" *read* "Infirmity."

The monthly incidence of births is shown in Table, H and graph. No. 1 for the three years, 1914, 1915 and 1916. The largest number of births was recorded in October and next in August and September. This is quite in conformity with what is observable every year.

Births by Months.

TABLE H.

Total No. of Births and their rates by months during the years 1914, 1915 and 1916.

Months.	1914.		1915.		1916.	
	Total No. of Births.	Birth rates.	Total No. of Births.	Birth rates.	Total No. of Births.	Birth rates.
January	1,574	36·4	1,477	34·2	1,506	34·8
February ...	1,220	28·2	1,298	30·0	1,214	28·1
March	1,424	32·9	1,558	36·0	1,359	31·4
April	1,398	32·2	1,315	30·4	1,623	37·6
May	1,392	32·2	1,344	31·1	1,682	38·9
June	1,565	36·2	1,593	36·9	1,830	42·3
July	1,788	41·4	1,376	31·8	2,014	46·6
August	1,611	37·3	1,423	32·9	2,148	49·7
September ...	1,813	41·9	1,997	46·2	2,133	49·4
October	1,163	26·9	1,648	38·1	2,234	51·7
November ...	1,425	33·0	1,489	34·5	1,960	45·3
December ...	1,868	43·2	1,813	41·9	1,972	45·6
Total ...	18,241	35·2	18,331	35·3	21,675	41·8

Birth by sex.

Out of 21,675 births the number of males was 10,866 and females 10,809, the proportion of males to 100 female births being 100·5, against 100 to 105·7 during 1915.

Illegitimate Births.

1,039 illegitimate births were registered during the year against 951 in 1915 and 818 in 1914.

TABLE I.

Showing the number of still-births and illegitimate births.

Years.	Still-births.	Illegitimate births.
1911	665	1,132
1912	674	1,025
1913	642	897
1914	606	818
1915	650	951
1916	975	1,039

Still-births.

There were 975 still births during 1916 against 650 in 1915 and 606 in 1914.

Deaths in 1916.

Total Mortality.

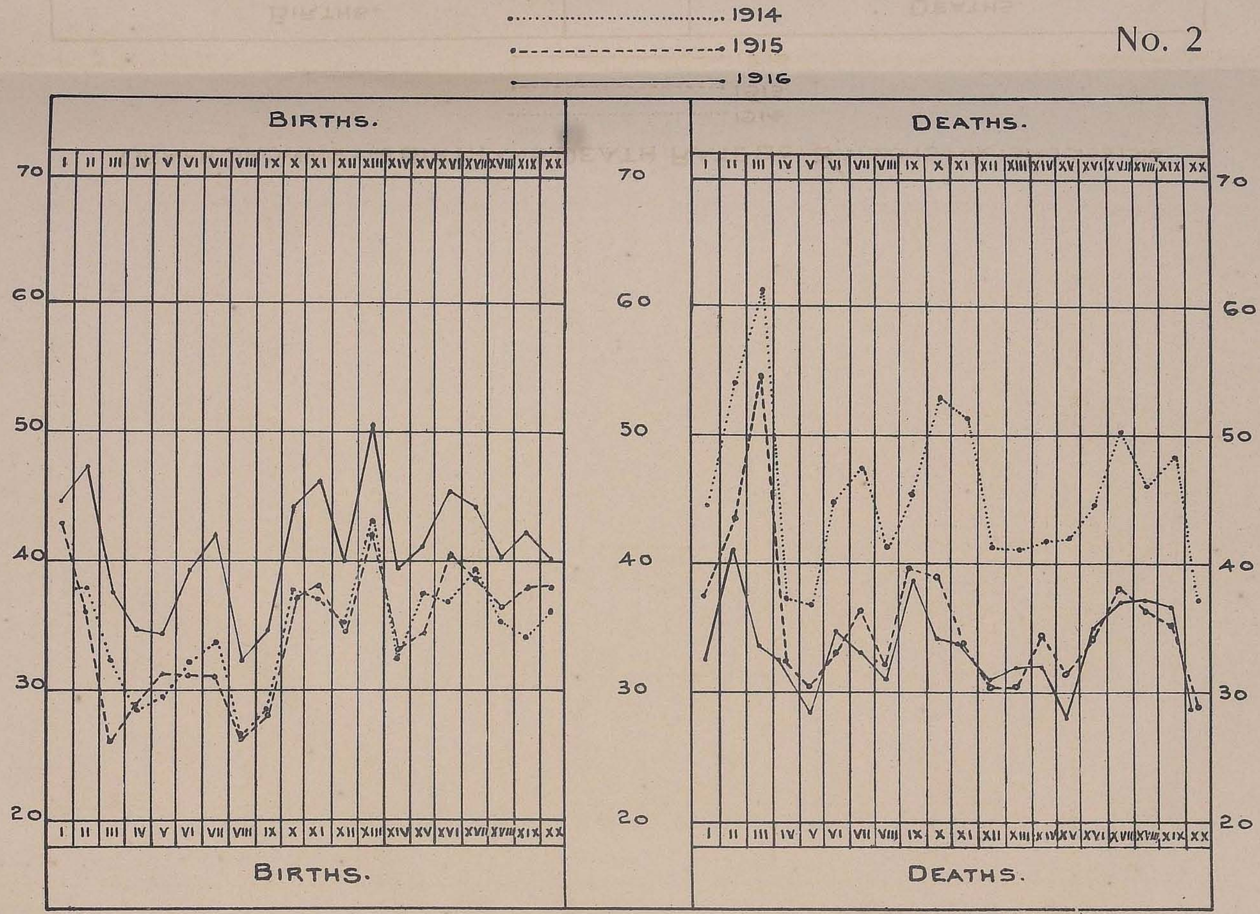
The number of deaths registered in the year exclusive of still-births was 17,872 against 18,688 in the previous year. The average of the previous five years was 21,088. The ratio of deaths calculated on the Census population of 1911 was 34·5 *per mille* against 36·0 in the previous year and 46·6 in 1914 and the mean ratio of the previous five years was 40·7. The death-rate calculated on the estimated population was 34·2. Graph., No. 2 shows the death-rates for the previous three years. It is gratifying to note that the mortality rate is the lowest for the previous 20 years, in spite of a severe attack of small-pox during the first half of the year.

Influence of Climate and Season.

Many important facts as to the relation between climate and disease, for example, the varying prevalence of Malaria, the endemic and epidemic prevalence of infectious diseases, of Diarrhoea or Dysentery, &c., can be statistically elucidated. The weekly and monthly general mortality rates are given in Tables, J. and K., respectively, and charts, Nos. 3, 4, 5 & 6 shows the weekly death-rates in the City for the years 1914, 1915 and 1916. There appear to be two seasons of high death-rate for Madras, corresponding to the first quarter and again the third quarter of the year. In Madras deaths from respiratory diseases are registered mainly during the months of January to March,—deaths from Diarrhoeaand Dysentry during the months, August and September.

GRAPH SHOWING THE BIRTH AND DEATH RATES BY DIVISIONS FOR 1914, 1915 & 1916.

No. 2



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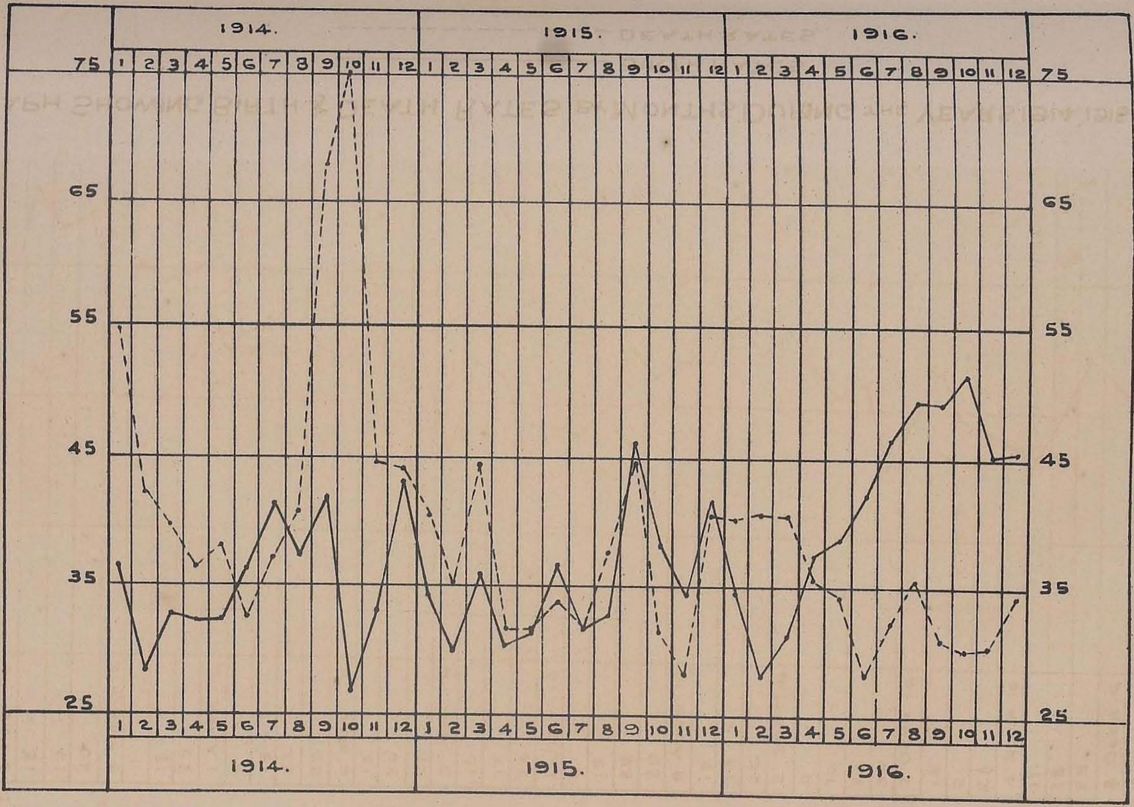
1917

GRAPH SHOWING BIRTH & DEATH RATES BY MONTHS DURING THE YEARS 1914, 1915 & 1916

No. 3

——— BIRTH RATES

- - - - - - DEATH RATES.



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GRAPH SHOWING THE BIRTH AND DEATH RATES ACCORDING TO WEEKS DURING THE YEAR 1916

No. 4

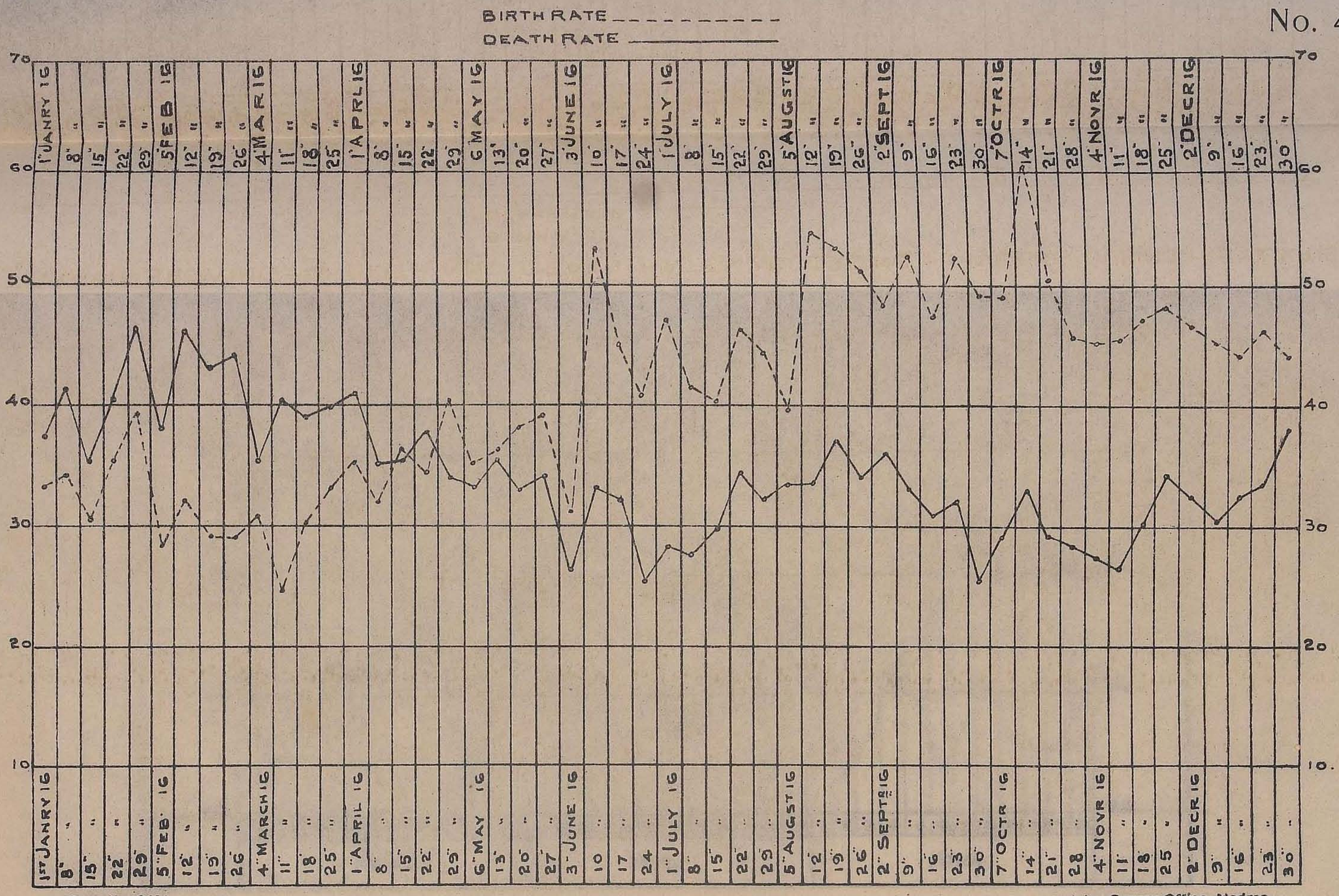

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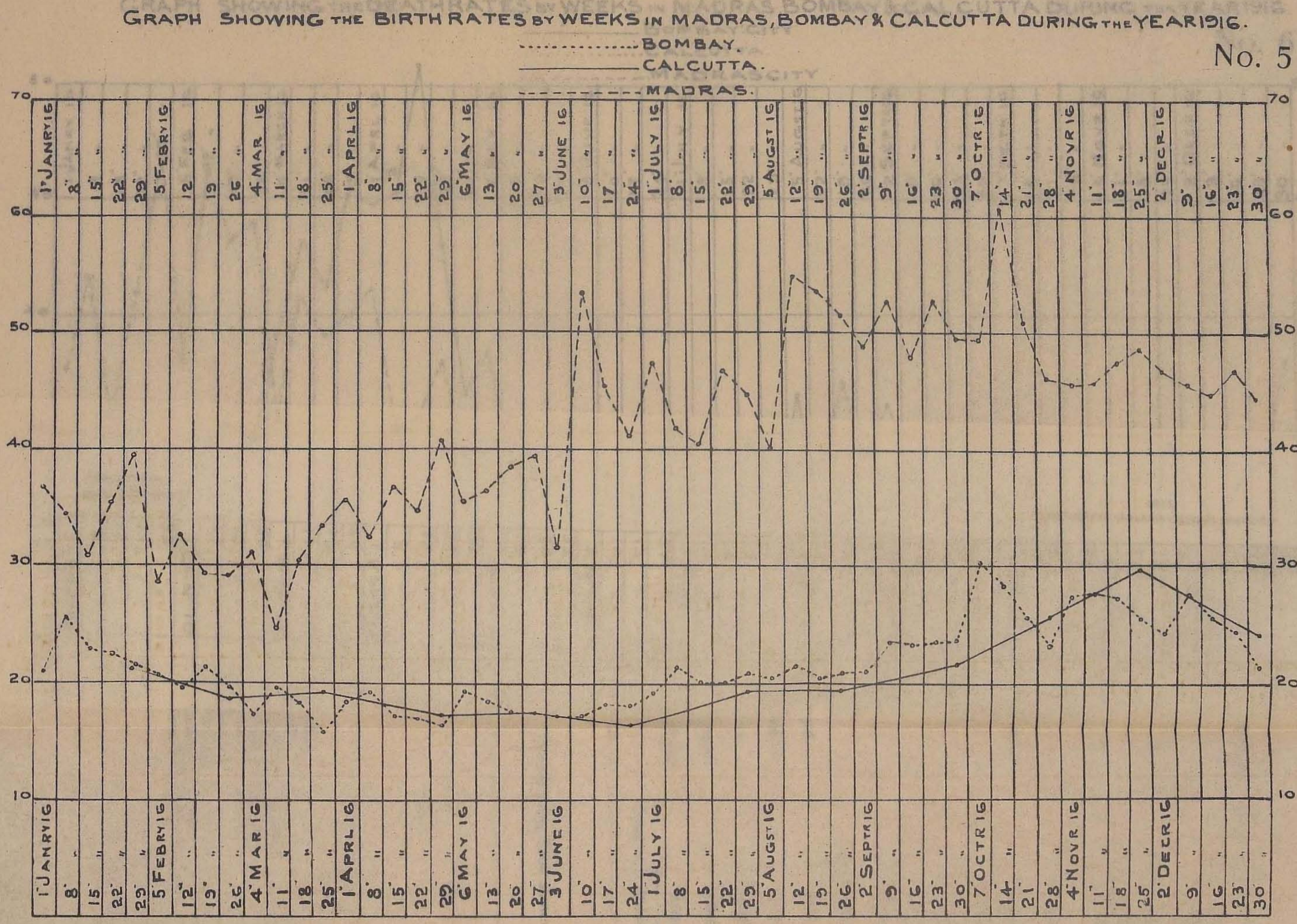
TABLE J.

Weeks ending, 1916.	Madras.		Calcutta.		Bombay.	
	Birth rates by weeks.	Death rates by weeks.	Birth rates by months.	Death rates by weeks.	Birth rates by weeks.	Death rates by weeks.
1st Jany. 1916.	33·6	37·7	...	29·3	21·0	28·8
8th " "	34·4	41·7	...	28·9	25·8	28·1
15th " "	30·9	35·7	...	27·7	23·0	29·3
22nd " "	35·4	40·9	...	28·9	22·8	29·9
29th " "	39·5	46·6.	21·4	28·2	21·7	30·3
5th Feb. "	28·5	38·2	...	25·5	20·9	31·8
12th " "	32·5	46·1	...	24·6	19·5	34·6
19th " "	29·3	43·3	...	23·3	21·2	35·3
26th " "	29·1	44·0	18·8	26·4	19·7	34·7
4th Mar. "	31·0	35·6	...	25·7	17·4	39·1
11th " "	24·9	40·7	...	25·5	19·7	43·2
18th " "	30·4	39·1	...	29·5	18·3	41·1
25th " "	33·2	40·0	19·3	25·5	15·9	45·0
1st April "	35·5	41·1	...	27·5	18·5	44·7
8th " "	32·1	35·3	...	25·9	19·1	45·2
15th " "	36·7	35·8	...	28·6	17·1	50·9
22nd " "	34·7	38·0	...	28·3	17·0	43·0
29th " "	40·9	34·1	17·3	26·4	16·3	36·6
6th May "	35·4	34·3	...	26·6	19·4	38·5
13th " "	36·4	35·8	...	23·5	18·6	33·7
20th " "	38·3	33·1	...	24·7	17·9	32·0
27th " "	39·4	34·1	17·7	25·7	17·5	33·3
3rd June "	31·2	26·6	...	19·9	17·1	29·2
10th " "	53·1	33·3	...	17·7	17·1	26·5
17th " "	45·3	32·3	...	20·3	18·4	25·0
24th " "	41·0	25·5	16·3	20·8	18·3	25·1
1st July "	47·2	28·5	...	20·5	19·3	26·9

TABLE J.—(*Continued*).

Weeks ending 1916.	Madras.		Calcutta.		Bombay.	
	Birth rates by weeks.	Death rates by weeks.	Birth rates by months.	Death rates by weeks.	Birth rates by weeks.	Death rates by weeks.
8th July 1916.	41·8	27·9	...	19·5	21·8	27·5
15th " "	40·3	29·9	...	19·8	20·0	24·6
22nd " "	46·5	34·8	...	21·4	20·0	29·7
29th " "	44·8	32·3	19·2	22·8	21·0	31·0
5th Aug. "	39·9	33·7	...	28·6	20·5	36·6
12th " "	54·8	33·8	...	21·5	21·8	31·2
19th " "	53·3	37·1	...	24·1	20·3	28·0
26th " "	51·1	34·1	19·2	20·3	21·0	27·4
2nd Sep. "	48·6	36·2	...	21·7	21·0	24·5
9th " "	52·6	33·4	...	20·6	23·0	29·3
16th " "	47·7	31·0	...	20·6	23·4	24·4
23rd " "	52·5	32·3	...	22·6	23·7	24·5
30th " "	49·2	25·7	21·7	23·0	23·9	27·2
7th Oct. "	49·1	29·1	...	21·9	30·0	26·0
14th " "	60·8	33·1	...	22·2	28·1	27·7
21st " "	50·8	29·2	...	24·0	25·7	25·7
28th " "	46·0	28·6	25·7	22·9	23·2	24·4
4th Nov. "	45·5	27·7	...	26·4	27·2	24·0
11th " "	45·8	26·7	...	24·1	27·8	27·5
18th " "	47·2	30·3	...	27·2	27·1	26·0
25th " "	48·4	34·5	29·7	26·1	25·6	26·3
2nd Dec. "	46·9	32·8	...	29·1	24·4	26·6
9th " "	45·6	30·9	...	26·9	27·7	28·0
16th " "	44·5	32·9	...	26·6	25·6	26·6
23rd " "	46·7	33·9	...	29·0	24·5	29·2
30th " "	44·3	38·2	24·1	28·3	21·4	28·2

No. 5



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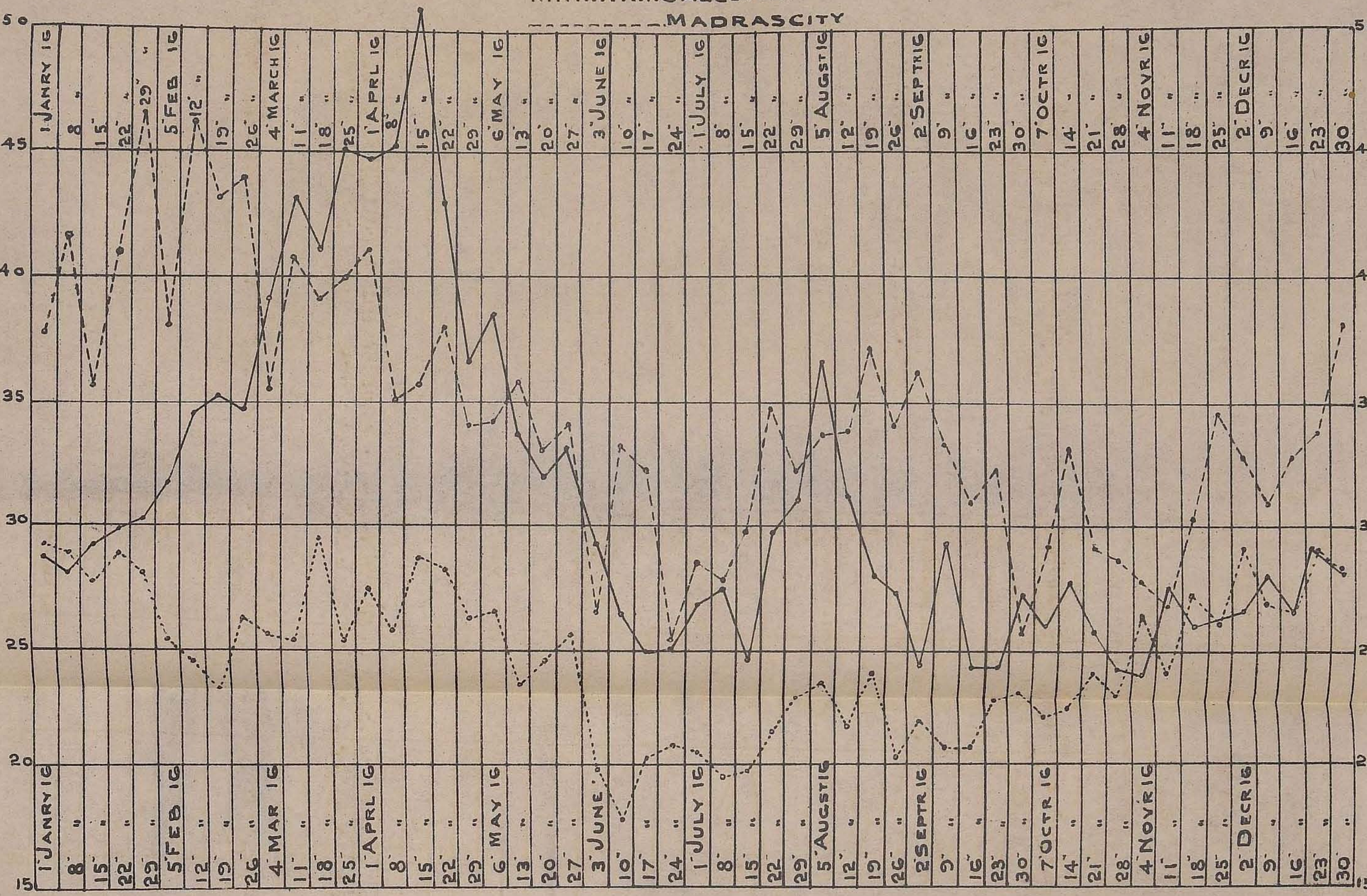
GRAPH SHOWING THE DEATHRATES BY WEEKS IN MADRAS, BOMBAY & CALCUTTA DURING THE YEAR 1916.

No. 6



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1917

TABLE K.

Total number of deaths and their rates by months during the years, 1914, 1915 and 1916.

Months.	1914.		1915.		1916.	
	Total No. of Deaths.	Death rates.	Total No. of Deaths	Death rates.	Total No. of Deaths.	Death rates.
January	2,370	54·9	1,744	40·4	1,737	40·1
February ...	1,825	42·2	1,520	35·2	1,761	40·7
March	1,715	39·7	1,927	44·6	1,754	40·6
April	1,566	36·2	1,379	31·9	1,544	35·7
May	1,643	38·0	1,366	31·6	1,487	34·4
June	1,403	32·5	1,465	33·9	1,226	28·4
July	1,599	37·0	1,381	32·0	1,390	32·2
August	1,847	40·8	1,626	37·6	1,539	35·6
September ...	2,930	67·8	1,938	44·8	1,338	31·0
October	3,249	75·2	1,362	31·5	1,305	30·2
November ...	2,023	44·7	1,221	28·2	1,309	30·3
December ...	2,004	44·2	1,759	40·7	1,482	34·3
Total ...	24,174	46·6	18,688	36·0	17,872	34·5

TABLE L.

The following Table shows the death-rates among the principal sections of the Hindu Community.

Sect.	Population (Census 1911).	1914.		1915.		1916.	
		Total No. of Deaths.	Ratio *per mille.*	Total No. of Deaths.	Ratio *per mille.*	Total No. of Deaths.	Ratio *per mille.*
Brahmin	32,727	995	30·5	792	24·2	828	25·3
Chetty	36,414	1,233	33·9	1,087	29·8	1,072	29·4
Vellahah or Mudaliar ...	66,551	2,917	43·8	2,185	32·8	2,031	30·5
Balijah or Naidu	47,811	2,059	43·1	1,519	31·8	1,445	30·0
Vanniah or Naicker ...	50,209	2,650	52·8	1,994	39·7	2,025	40·3
Pariah	59,651	3,015	50·6	2,267	38·0	2,345	39·3
Patnawar	9,799	555	56·6	428	43·7	379	38·6
Yadaval or Idayar ...	14,308	802	56·0	522	36·5	462	32·3
Visva Brahmin or Kammalar ...	15,626	643	41·1	633	40·5	568	36·3

TABLE M.

Table of death-rates for the different races in the City for 1914, 1915 and 1916.

Race or Caste.	Population (Census 1911).	1914.		1915.		1916.	
		Total No. of Deaths	Death rate *per mille.*	Total No. of Deaths	Death rate *per mille.*	Total No. of Deaths	Death rate *per mille.*
Europeans ...	4,187	78	18·6	72	17·2	82	19·6
Anglo-Indians ...	10,332	349	33·8	282	27·3	212	20·5
Indian Christians.	27,293	1,015	37·2	816	29·9	720	26·4
Hindus ...	4,15,910	19,281	46·4	14,958	36·0	14,501	34·9
Muhammadans ...	59,169	3,450	58·3	2,560	43·3	2,352	39·8
Others ...	1,769	1	0·6	...	...	5	2·8
Total ...	5,18,660	24,174	46·6	18,688	36·0	17,872	34·5

Sex.

The deaths among males numbered 9,051 and among females 8,821, the proportion being 102·6 males to every 100 females.

Class.

The number of deaths registered among Europeans was 82, Anglo-Indians 212, Indian Chrirtians 720, Hindus 14,501, Muhammadans 2,352 and others 5, the ratios being 19·6, 20·5, 26·4 34·9, 39·8 and 2·8, respectively.

Age.

Mortality among infants under one year of age was as usual the heaviest *viz.* 5,746, next come 2,905 among adults of 60 years and upwards. Next comes age group one to five years with 2,742 deaths, so that out of 17,872 deaths as many as 8,488, or 47·5 per cent., occur amongst children under one year and between the ages one and five. There is a sudden drop thereafter in the age periods 5 and 10, 10 and 15 and 15 and 20 years. Then again the mortality rises until the maximum is reached in the age period 60 and upwards.

Causes of Mortality.

Infectious Diseases, Malaria:

Malaria caused 4·3 per cent. of total deaths against 9·0 in the previous year and 11·0 in 1914, or expressed in the ratio *per mille* 1·5, 3·3 and 5·1, respectively. Annual Form X (see graphs Nos. 7, 8 & 9) shows that persons died of this cause against 1,686 in 1915. A detailed report on Malaria is included in Part II of this volume.

Enteric Fever.

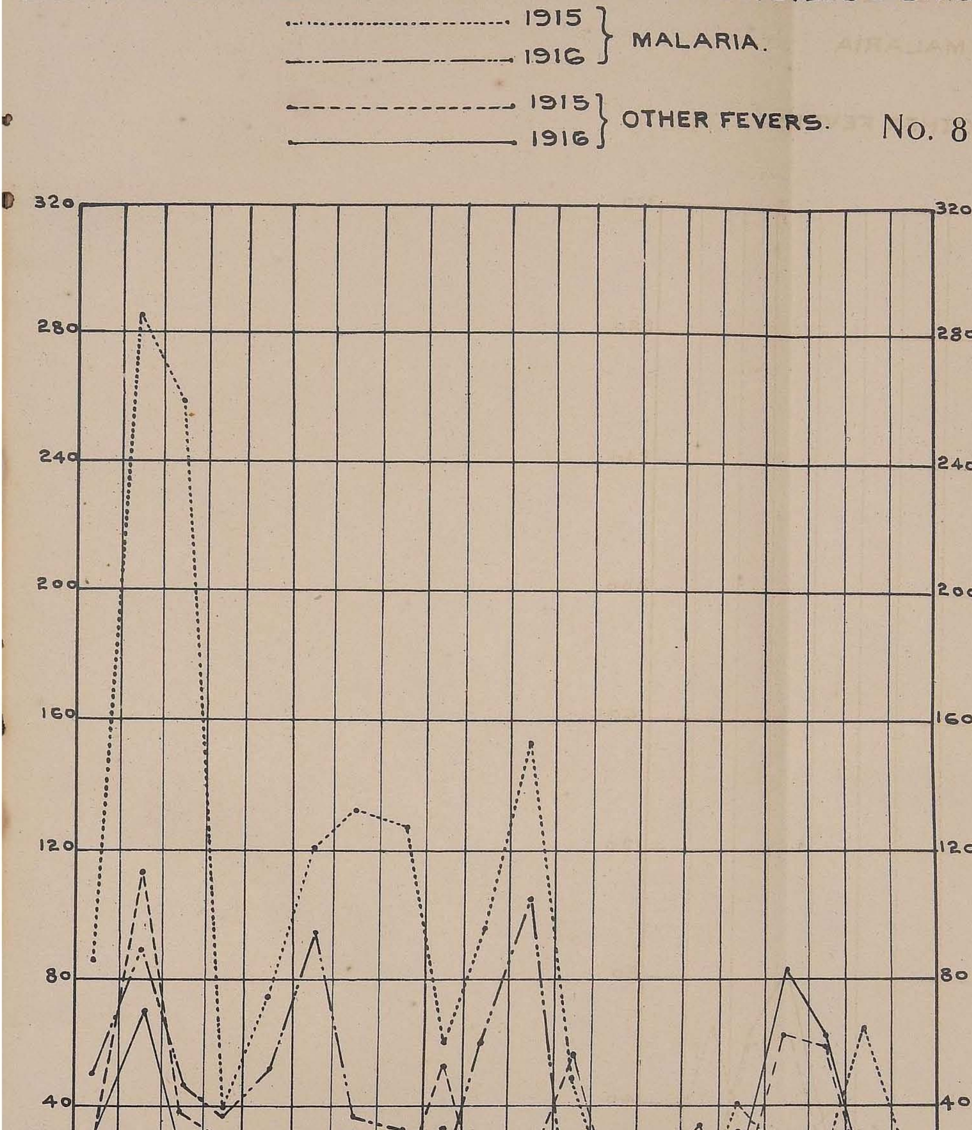
49 deaths occurred from Enteric during the year, giving a ratio of ·09 *per mille* against 0·1 in 1915 and 0·1, 1914. The mean ratio for the previous five years is 0·1. It is an endemic disease in this City, a few cases

No. 7

1915 MALARIA
1915 OTHER FEVERS
1916 MALARIA
1916 OTHER FEVERS.
220
200
180
160
140
120
100
80
60
40
20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUGST
SEPTER
OCTR
NOVER
DECER

GRAPH SHOWING DEATHS FROM MALARIA & OTHER FEVERS BY DIVISIONS

No. 8



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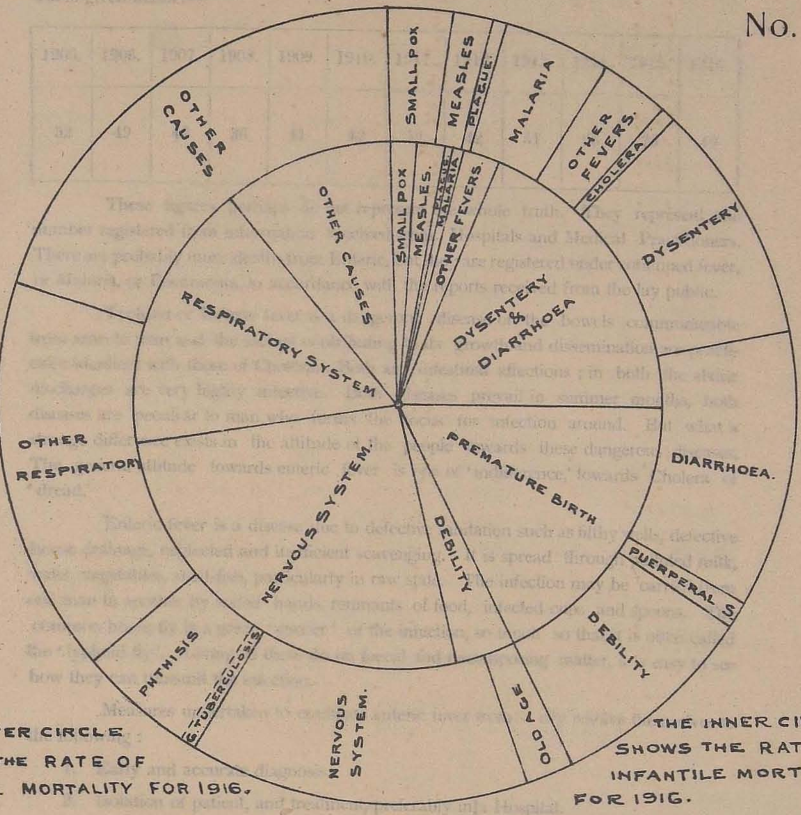
1917

DIAGRAM SHOWING PERCENTAGES OF DEATHS FROM PRINCIPAL CAUSE TO TOTAL MORTALITY & INFANTILE DEATH RATES TO THE TOTAL DEATHS OF CHILDREN UNDER ONE YEAR OF AGE IN 1916.

No. 9



THE OUTER CIRCLE SHOWS THE RATE OF GENERAL MORTALITY FOR 1916.

THE INNER CIRCLE SHOWS THE RATE OF INFANTILE MORTALITY FOR 1916.

PRINCIPAL CAUSES	PERCENTAGE OF DEATHS TO THE TOTAL MORTALITY	PERCENTAGE OF INFANTILE MORTALITY TO THE TOTAL DEATHS UNDER 1 YEAR OF AGE.
SMALL POX	2.66	1.13
MEASLES	1.58	1.36
PLAGUE	0.06	0.02
MALARIA	4.27	0.23
OTHER FEVERS	2.95	0.44
CHOLERA	0.17	
DYSENTERY	9.34	18.10
DIARRHOEA	10.64	
PUERPERAL SEPTICAEMIA	0.56	-
DEBILITY	8.25	4.37
OLD AGE	2.08	-
NERVOUS SYSTEM	13.45	28.94
GENERAL TUBERCULOSIS	0.43	16.57
PHTHISIS	4.47	
OTHER RESPIRATORY	15.96	
OTHER CAUSES	23.70	11.02
PREMATURE BIRTH	NIL	17.84
TOTAL	94.57	100.02

Reg: No. 2449
Copies 350

Vandyke, Survey Office, Madras.
1917

being reported during all parts of the year and the maximum incidence being in summer months. The number of deaths from this disease returned for 12 years is given in Table given below:—

1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
52	49	42	36	41	42	52	42	51	66	75	49

These figures perhaps do not represent the whole truth. They represent the number registered from information received from Hospitals and Medical Practitioners. There are probably more deaths from Enteric, but they are registered under continued fever, or Malaria, or Pneumonia, in accordance with the reports received from the lay public.

Typhoid or Enteric fever is a dangerous disease of the bowels communicable from man to man and the factors contributing to its growth and dissemination are practically identical with those of Cholera. Both are intestinal affections ; in both the alvine discharges are very highly infective. Both diseases prevail in summer months, both diseases are peculiar to man who forms the focus for infection around. But what a strange difference exists in the attitude of the people towards these dangerous diseases. The general attitude towards enteric fever is one of 'indifference,' towards Cholera of 'dread.'

Enteric fever is a disease due to defective sanitation such as filthy wells, defective house drainage, neglected and inefficient scavenging. It is spread through polluted milk, water, vegetables, shell-fish, particularly in raw state. The infection may be carried from one man to another by soiled hands, remnants of food, infected cups and spoons. The common house fly is a great 'carrier' of the infection, so much so that it is often called the 'typhoid fly'. Living as these do on foecal and decomposing matter, it is easy to see how they can transmit the infection.

Measures undertaken to eradicate enteric fever from a city resolve themselves to the following :

1. Early and accurate diagnosis.

2. Isolation of patient, and treatment, preferably in a Hospital.

3. Protection of all articles of food and drink from being polluted by infected fingers, flies, &c.

4. Sanitary reforms of defects noted above

5. Careful collection and thorough disinfection of all discharges from the patient such as urine, foeces, sputum. These should on no account be thrown about within the vicinity of human habitations nor allowed to enter the public drain or sewer before proper disinfection.

6. With regard to personal prophylaxis, boiled water, boiled milk and well cooked food, are points to remember.

Flies.

It is essential to deal with their breeding places. Frequent cleansing of receptacles for house refuse and manure prevents the breeding of flies. The ova of the flies when deposited on organic matter develope into the adult insect in about eight to ten days.

Destruction of flies in a dwelling house may be secured by fly traps, fly catching papers, &c. "An efficacious method is the use of saucers containing a solution of formalin (one teaspoonful to the half pint of water or milk and water) and a little sugar; a small piece of bread being placed in the saucer as a place for flies to alight on and drink. In living rooms these should be left out overnight, all other vessels containing fluid being removed or covered over."

Kala Azar.

39 deaths were registered as due to Kala-azar. The corresponding numbers for 1914 and 1915 were 13 and 18 respectively. The statistics under this head are not reliable. The disease is not recognised at all in its early stages, and with difficulty even at an advanced stage. Deaths from Kala-azar are often returned under simple continued fever, or Malaria or Dysentery.

Cholera.

Out of 48 cases reported during the year 30 proved fatal, against 66 attacks and 35 deaths in the previous year, the ratio being 0·1 *per mille.* The mean ratio for the quinquennium was 1·1 against 1·2 in the previous year. Of these cases 7 were imported from surrounding villages and 41 were indigenous. Of these 48 cases, 16 were sent to Infectious Diseases Hospitals. All the infected houses were disinfected, and the water of the well, if there existed one, was hankinised.

Small pox.

The number of attacks during the year was 1,489 of which 476 proved fatal. The death-rate was 0·9 *per mille.* The highest number of deaths in any one month was 113 in March. The number of deaths in the previous year was 92 and the mean ratio for the previous five years was 0·3.

Small-pox Epidemic in Madras, during 1916.

During the year under review the health of the City was much disturbed by an epidemic of small-pox. Starting at the close of the previous year it continued almost to the end of the year under review, although its severity was brought under control in about four or five months.

Small-pox in Madras.

Small-pox occurs in Madras almost every year in a sporadic form. From the records I find that small-pox was epidemic in Madras in certain previous years, namely, 1901, 1905, 1906, 1911 and 1912. In the intervening years a few sporadic cases did occur and the following table gives details :—

Year.	*Attacks.*	*Deaths.*
1901	Number of attacks not mentioned in reports.	292
1902		69
1903		7
1904		12
1905		329
1906		620
1907	123	49
1908	114	13
1909	68	13
1910	278	116
1911	1,060	480
1912	247	106
1913	136	34
1914	146	66
1915	314	92
1916	1,489	476

History of the Epidemic.

In August 1915 a few sporadic cases occurred, especially in the Parthasarathy Koil Kuppam and other parts of Triplicane, and in some parts of Purasawakam and Perambur amongst people coming into the town from the surrounding villages where small-pox was very prevalent just then. In September we had 42 cases ; efforts were at once made to trace early cases, and in fact we were able to keep down the disease till about the middle of December 1915, as the figures in the following Table will show :—

		Attacks.	*Deaths.*
1915.			
September	...	42	14
October	...	32	15
November	...	18	9
December	...	55	17
		147	55
1916.			
January	...	255	64
February	...	349	80
March	...	340	113
April	...	179	75
May	...	96	37
June	...	65	29
July	...	62	28
August	...	45	19
September	...	28	10
October	...	24	10
November	...	13	5
December	...	33	6
		1,489	476

During December 1915 there was a large concourse of people into the City to witness the Park Fair Exhibition and tamashas, and I received several complaints of cases just recovering or convalescent from small-pox, travelling into Madras. In fact every Corporation official who worked as a volunteer during this occasion noticed cases of small-pox in the scabbing stage within the enclosures of the People's Park.

The rain-fall in the quarter ending with 31st December 1915 was comparatively less than in previous years, *viz.*, 23·84 inches as against an average of 34·4 for the five-year period ; dryness facilitates spread of the infection. There was a large influx of people who lodged in a most haphazard fashion and the infection that had just started flared into an epedemic. This is what usually happens in every place of pilgrimage with regard to out-breaks of cholera and small-pox under similar circumstances.

The disease was declared epidemic on 22nd January 1916 and the severity of the out-break lasted for four months (Between January and April 1916). From May onwards the disease rapidly declined so that in May 1916 we had only 96 attacks and 37 deaths.

In a large majority of cases it was difficult to obtain information with regard to the source of infection. Either the patient was removed to a non-infected house from an infected house in the same locality; or there was a case or two convalescent from a mild attack of small-pox, "modified," but treated as measles or chicken-pox. Small-pox under the Act is notifiable, but only by medical men of the Allopathic system, and by Ayurvedic Physicians and Hakeems. The lay public have no responsibility in the matter. Would it be possible to make the small-pox a disease to be "compulsorily notified," *by every one who has a cognisance of its existence*? Then we might hope to act promptly in the very early sporadic cases and so stop the spread of the disease. At present we come to know of the existence of a dangerous disease—this is specially so in Small-pox—either after death or during the convalescent period of the sick person. In either cases we are too late and the infection may have been carried to other places.

Sources of Infection.

The lay public do not appear to be alive to the contagiousness of the disease and to the dangers resulting from close personal contact with the sick. Partly on account of this, and partly on account of the apathy and a general disinclination to follow the prophylactic measures recommended by the Municipal Executive,—especially isolation, re-vaccination—efforts are more often made to conceal cases rather than to disclose them for treatment.

We were thus obliged to depend for our information on other sources.

1. Burial ground peons were directed to examine every dead body taken to the burial ground for any signs of pock marks, and to make a special report to the office.

2. Heads of public offices, Commercial firms, Schools and Colleges notified to us the reported existence of the infection among their employees or students or in the houses where they lived.

3. Medical Registrars were requested to make exhaustive enquiries in and around the localities where deaths were reported, to find out if deaths were due to Small-pox.

4. Sanitary Inspectors, Medical Vaccinators, Plague and Malaria Nurses, were requested to make house to house inspections to trace cases of Small-pox.

Small-pox by race.

The Table given below gives the distribution of Small-pox among different races:—

Race.	Attacks.	Deaths.	Percentage of Mortality.
Europeans	4	...	...
Anglo-Indians	48	8	16·66
Indian Christians	116	20	19·24
Hindus	1,203	292	32·59
Muhammadans	118	56	47·46
Total ...	1,489	476	31·97

The epidemic was more widely spread and more severe in the South Range than in the North Range. 988 attacks and 311 deaths were returned from the South Range as against 501 attacks and 165 deaths in the North Range. The divisions worst affected in the South Range were 11 & 12, 13 & 16, 17, 18 & 19, and in the North Range, Divisions, 2, 6, 7, 8 and 9 returned higher figures than others. The following Table shows the distribution of the disease in the City according to Divisions. It should not, however, be supposed that the disease spread uniformly over all the Divisions thus affected. Even in the worst affected ones, the epidemic was confined only to certain localities or streets :—

Small-pox by Divisions.

Division.	*Attacks.*	*Deaths.*
1	48	16
2	71	32
3	16	5
4	22	7
5	55	12
6	63	18
7	83	31
8	67	30
9	76	14
	501	165
10	44	9
11	92	16
12	87	28
13	113	31
14	6	3
15	37	12
16	94	17
17	149	57
18	152	61
19	169	61
20	45	16
	988	311
Grand Totals ...	1,489	476

From the above it will be seen that the infection was very severe in Triplicane, Royapettah, and Pudupet. One curious feature of the out-break was that the infection appeared to linger in certain specified localities, and cases continued to be reported from these at intervals of weeks or months. Thus Parthasarathy Kuppam and area around the Triplicane Temple, and the P. R. Square in Park Town reported cases throughout the epidemic period.

TABLE N.

Showing attacks and deaths from small-pox at various age periods.

Age Period.	Attacks.	Deaths.
Under one year	155	89
Above one year and under five years	279	134
Above five years and under ten years	167	50
Above ten years and under 12 years	63	8
Above 12 years and under 15 years	48	6
Above 15 years and under 20 years	222	45
Above 20 years and under 25 years	208	44
Above 25 years	344	100
Total ...	1,489	476

Measures taken to combat the Disease.

Removal of the patients to the Infectious Diseases Hospitals was insisted upon in the majority of cases. Where well-to-do people objected to this, isolation and segregation was permitted on certain conditions. When a request for the removal of a patient to the Isolation Hospital was not complied with, notices under sections 366 of the Act were served, and prosecutions launched after a few hours. 98 notices were served, 58 complied with before prosecution, 16 prosecutions were conducted.

In every case of removal to the Hospital the cart-hire was borne by the Corporation and nearly Rs. 100 was paid in the shape of hire. 485 cases were sent to the two Isolation Hospitals, 415 were discharged cured and 70 died. The discharged patients were kept under observation for some time by the Sanitary staff. The following conditions were imposed on patients segregated in private houses :—

1. A well ventilated house was chosen, from which all articles of furniture, wall hangings, &c., were removed.

2. Only one attendant was allowed to nurse the patient and was advised not to mix freely with others

3. The patient was not allowed to go out till permitted by us ; and during the scabbing stage, he was advised to annoint his body with some antiseptic oil.

4. All soiled clothes, &c., were soaked in lotion and a large vessel containing the same lotion was always kept in readiness ; the doors and windows were protected by cloth screens moistened with the lotion.

5. All contacts in the house were re-vaccinated ; and if there were any infants under six months they were also vaccinated.

6. The contacts were stopped from attending Public Offices, Schools, &c., Sanitary Inspectors were instructed to visit infected houses once or twice every day to observe contacts. Assistant Health Officers made surprise visits to see that their instructions were carried out.

When the patient was removed to the Hospital, or was declared free from infection when isolated in his house, the room occupied by him was thoroughly disinfected, often in the presence of the Assistant Health Officer, and the whole house white-washed. The auto-spray of Messrs. Smith Stanistreet & Co., Calcutta, served a very useful purpose as it very much simplified the disinfection of walls and ceiling. Neither the patient nor contact was allowed to resume duty without a certificate from the Health Officer to the effect that the affected house was free from infection.

Revaccination.

Mention must be made here of the large number of revaccinations performed during the first 4 or 5 months of the year. As soon as the disease was declared epidemic, circulars regarding the advisability of re-vaccination were sent to the Press and to Schools, Colleges, Firms and other Institutions. The response was very satisfactory and the demand for revaccination was so great that the normal staff was not able to cope up with the work and two additional Vaccinators were employed for two months. Plague and Malaria Nurses were also asked to help the divisional vaccinators in tracing out cases in infected localities, and if possible to vaccinate people in their houses. These Nurses were especially useful in visiting gosha houses.

The methods of Checking the evil.

There is no measure so efficient as getting oneself protected against the disease, *i.e.*, every one must be vaccinated. Primary vaccination is compulsory in the City of Madras and the laws to enforce vaccination are strict enough. But the lay citizen of Madras must be educated further before he submits to the operation of his own free will. Much opposition is met with in the exercise of these laws, but still over 16,000 children under one year are primarily vaccinated annually. (For 1916 total vaccinations 65,832 ; children under one year 16,053) Vaccination should not stop here. As already stated immunity wears away in a child after about 7 years, and he becomes susceptible to the disease again. This means that he must be protected again, *i.e.*, re-vaccinated. Immunity against Small-pox *for life* is usually conferred on persons *successfully* vaccinated on two occasions. The word *successfully* is very important. It is no use getting a small scratch with the lancet bearing a little lymph and saying that one is re-vaccinated.

During the epidemic this year special efforts were made to extend re-vaccinations as widely as possible and between November 1915 and April 1916, as many as 28,859 persons were re-vaccinated.

Vaccinal Condition of Small-pox cases.

Accurate information is not always available from enquiries made with regard to the vaccinal conditions of Small-pox cases. A large number of cases of Small-pox are reported after death, the Sanitary Inspectors are told that the deceased was vaccinated, and the Sanitary Inspector in turn reports "said to have been vaccinated in childhood" or "vaccinal condition not known."

In judging the relative value of vaccination as a prophylactic against Small-pox or as a means of reducing the virulence of the disease, much reliance could not be placed upon such vague and unverifiable information.

The following remarks are based on 673 cases of Small-pox, in which the vaccinal conditions of every case was accurately reported after a careful and personal observation. Of the 673 cases the reports of 485 cases were received from the two Corporation Infectious Diseases Hospitals recording the vaccinal conditions of cases of Small-pox admitted in them.

TABLE O. (See Diag. 10).

——	VACCINATED.		UNVACCINATED.	
	Attacks.	Deaths.	Attacks.	Deaths.
Under one year	12	5	63	39
Above one and under five years	32	9	69	34
Five and under ten years	53	2	17	5
Ten and under fifteen years	45	2	8	2
Fifteen and under twenty years	76	4	11	1
Twenty and under twenty-five years ...	71	3	8	1
Twenty-five years and above	181	15	27	13
Total ...	470	40	203	95

The amount of protection or the immunity against Small-pox conferred by Small-pox is well illustrated in the above table. Of the 75 cases amongst infants under one year of age whose vaccinal conditions were verified it is found only 16 per cent of the attacks with a case mortality of 41·7 per cent. were amongst the vaccinated, against 84 per cent. and 62 per cent. respectively in the unvaccinated. The same relative advantage to the vaccinated as against the un-vaccinated is again illustrated in the next age group 1 & 5 in which the ratios work out as follows :—

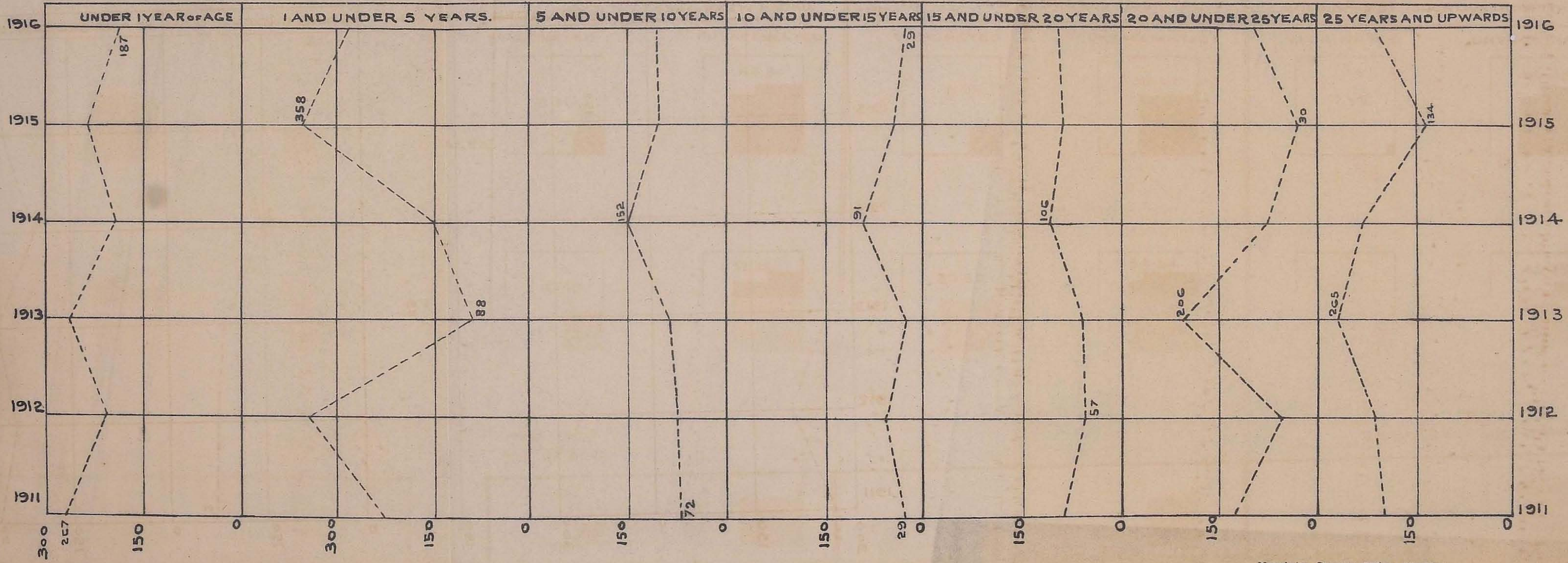
	per cent. of atttacks.	case mortality.
Vaccinated	31·68	26
Un-vaccinated	68·32	50

The slightly greater rise in the ratios obtained in the above age period as compared with that of infants under one year is due to the fact that the amount of protection conferred from vaccination is in inverse proportion to the interval that elapses between the date of vaccination and the time when the same vaccinated individual is exposed to the infection. Thus in several instances where the child suffering from Small-pox was vaccinated nearly 4 to 4½ years prior to the attack of the disease, the immunity has worn away and the child stands every chance of contracting the disease, especially if the dose of the virus received by it is sufficiently strong.

This is best shown by the figures given in the age group 5 to 10 years of age. Of the 70 attacks noted in this age group 75·7 per cent. were amongst vaccinated and 24·3 per cent amongst unvaccinated—ratios which are directly opposite to those under the age group of infants under one year of age, although the case mortality amongst vaccinated,

GRAPH SHOWING THE NUMBER OF DEATHS AT VARIOUS AGE PERIODS TO 1000 DEATHS FROM SMALL POX DURING THE YEAR 1911-1916.

No. 10



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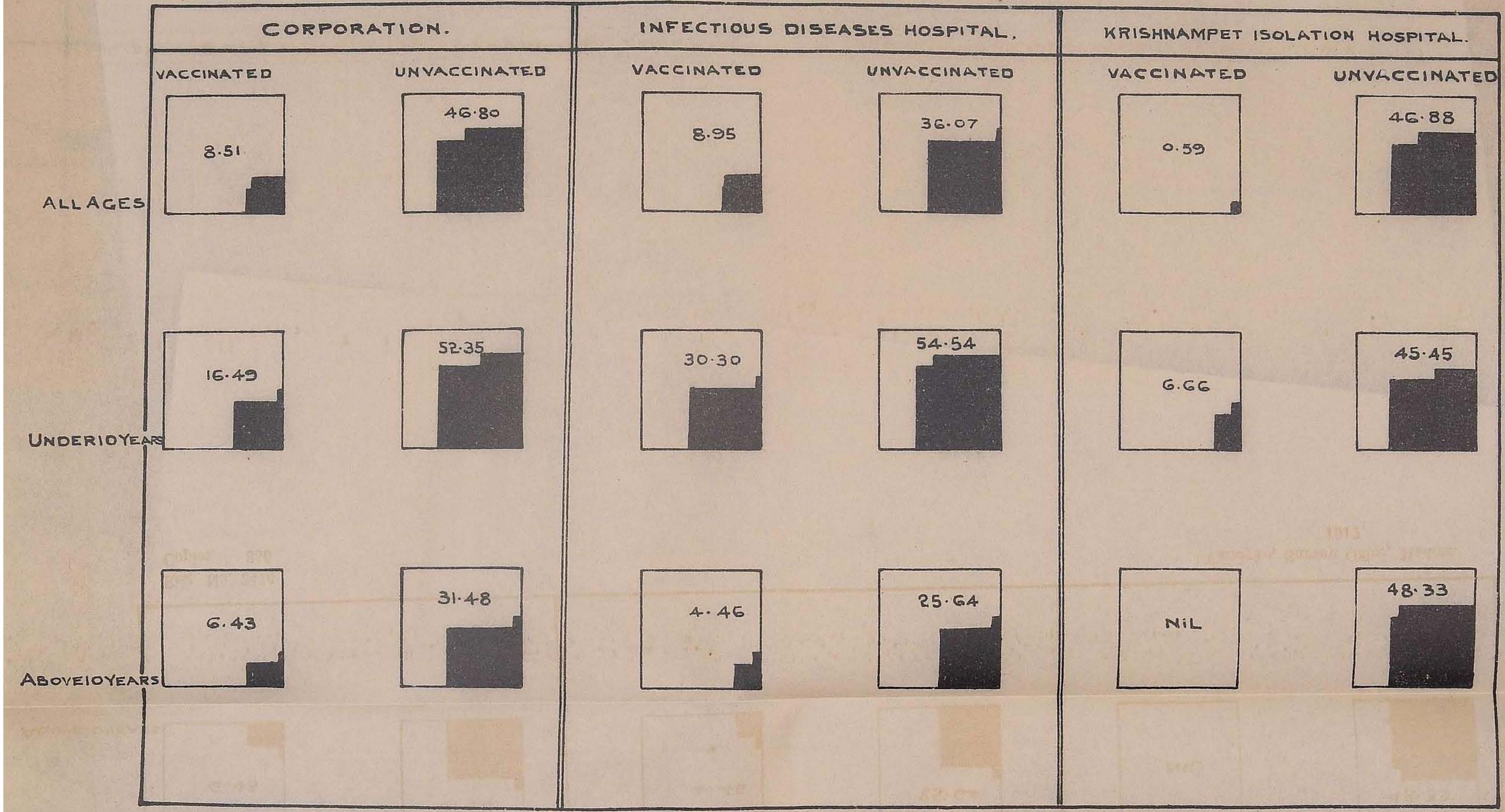
1917

PERCENTAGE FATALITY (CASE-MORTALITY) IN MADRAS AMONG UNVACCINATED & VACCINATED UNDER TEN AND OVER TEN YEARS OF AGE.



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1917.

(3·77 per cent.) is still better than amongst the un-vaccinated, (30·70). Again in persons above 10 years of age there were 427 cases of which 373 or 17·4 per cent were amongst the vaccinated with a case mortality of only 6·5 per cent. and 54 or 12·16 per cent. were amongst the unvaccinated with a case mortality of 31·5.

The explanations for this altered age incidence are :—

1. The protection afforded by vaccination against attacks of Small-pox lasts on an average for a period of seven years, and after this period the vaccinated when exposed to the infection under suitable circumstances are as likely to contract the disease as the non vaccinated. But the power of vaccination to modify the disease is still considerable.

2. In a community where only primary vaccination is compulsory but not revaccination the majority of children under 10 years of age will have been vaccinated at some time. The unvaccinated will be either fresh arrivals from places where the vaccination laws are not in force or local residents who have evaded vaccination. As a result of this the population consists of children and young persons possessing varying grades of immunity against Small-pox and in the course of a few years there will exist an appreciable number who were once given the protection but who have gradually lost it and have therefore, become susceptible to Small-pox.

Thus in studying the statistics of the vaccinal conditions of Small-pox cases and comparing the case incidence amongst the vaccinated and the unvaccinated, it is essential to base calculations on the total population of the place under consideration divided into two groups ; namely ;—

1. Those who were vaccinated or re-vaccinated within a period of five to seven years previous to the time of attack in the individual or to the period of prevailing epidemic of Small-pox.

2. Those who have not been vaccinated at all or were vaccinated earlier than the period of years noted above.

Such figures cannot be obtained at present. The decennial census figures might with advantage include statistics showing the vaccinal conditions during the intercensal period of the population of any City, Town or village, where compulsory vaccination laws are in force.

The influence of vaccination in modifying an attack of Small-pox is further illustrated in the diag. No. 11.

General Remarks.

From January 1916 to 31st December 1916 there were 1,489 attacks and 476 deaths and between September and December 1915, there were 147 attacks and 55 deaths. The grand total number of attacks and deaths from 1st September 1915 to 31st December 1916 (16 months) is 1,636 and 531 respectively. The mortality rate amongst the attacked is 32·46. These figures, though they look large, do not, it is feared, represent the actual total of attacks, notwithstanding the fact that special efforts were made during the year to make the figures of vital statistics (including figures of Small-pox) as accurate as possible.

From the Table on page 22 it will be seen that Small-pox occurs in an epidemic form at certain intervals—the intervening years having a few sporadic cases. This is to be explained by the fact that (1) re-vaccination is not compulsory, (2) Mild sporadic cases often escape our notice and convalescents from Small-pox act as centres of

infection which may lie dormant until it finds suitable conditions when it will burst forth into an epidemic.

What usually happens is this: one epidemic strikes a panic into the population and people willingly submit to re-vaccination—a large number of these are protected. The absence of an epidemic in the few succeeding years is probably due to the presence of such protected individuals in the community; and as there is no law enforcing re-vaccination, this wholesome practice of being re-vaccinated and thereby getting a fresh protection is abandoned, and when there are sufficient susceptible individuals and the contagion is introduced up starts an epidemic. The number of cases re-vaccinated during seven years 1910-1916 (both inclusive) is as follws :—

1910	... 7,769
1911	... 13,249
1912	... 5,512
1913	... 3,755
1914	... 4,622
1915	... 10,562
1916	... 46,120

From the above it is seen that re-vaccinations during the seven years prior to 1917 was practicably negligible for a population of nearly 520,000.

Preventive measures resolve themselves into (1) making both *vaccination and revaccination compulsory* (2) early recognition of cases and (3) prompt isolation. It is too much to expect that re-vaccination can be made compulsory when primary vaccination is itself not compulsory over the whole Presidency. But at least it may be made compulsory for contacts to get themselves re-vaccinated.

Measles.

There were 282 deaths during 1916. The mortality rate is 1·58 per cent. of total deaths. During 1915 there were only 81 deaths. The mortality ratio *per mille* of population was ·5 in 1916, the average for the quinquennium being 0·2.

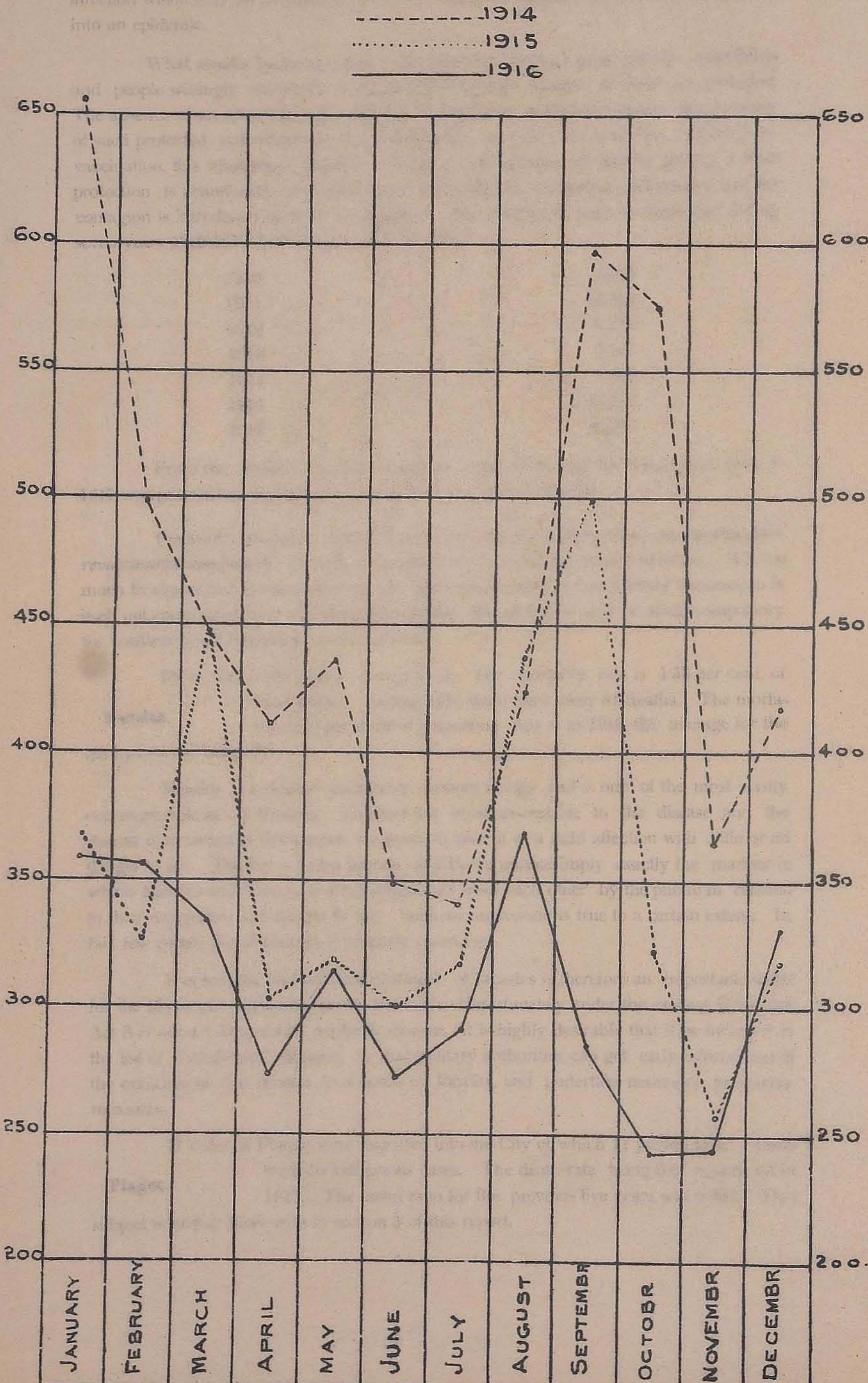
Measles is a disease peculiar to human beings and is one of the most easily communicable of all diseases. Children are most susceptible to the disease and the disease is so common that parents are prone to take it as a mild affection with little or no danger to life. The terms China ammai and Perya ammai imply exactly the manner in which Measles and Small-pox are distinguished from each other by the public in relation to their recognition and danger to life. Such an impression is true to a certain extent. In fact few people die of Measles if properly cared for.

Prophylactic and curative treatment of Measles is therefore an important matter for the Municipal administration to deal with. Unfortunately under the existing Municipal Act it is not a "dangerous" notifiable disease. It is highly desirable that it be included in the list of "notifiable" diseases, so that sanitary authorities can get early information of the existence of this disease in a house or locality, and undertake necessary preventive measures.

Plague.

17 cases of Plague were imported into the City of which 11 proved fatal. There were no indigenous cases. The death-rate being 0.02 against nil in 1915. The mean ratio for the previous five years was 0·004. This subject is further dealt with in section 5 of this report.

GRAPH SHOWING THE TOTAL DEATHS FROM DYSENTERY & DIARRHOEA BY MONTHS IN THREE YEARS.



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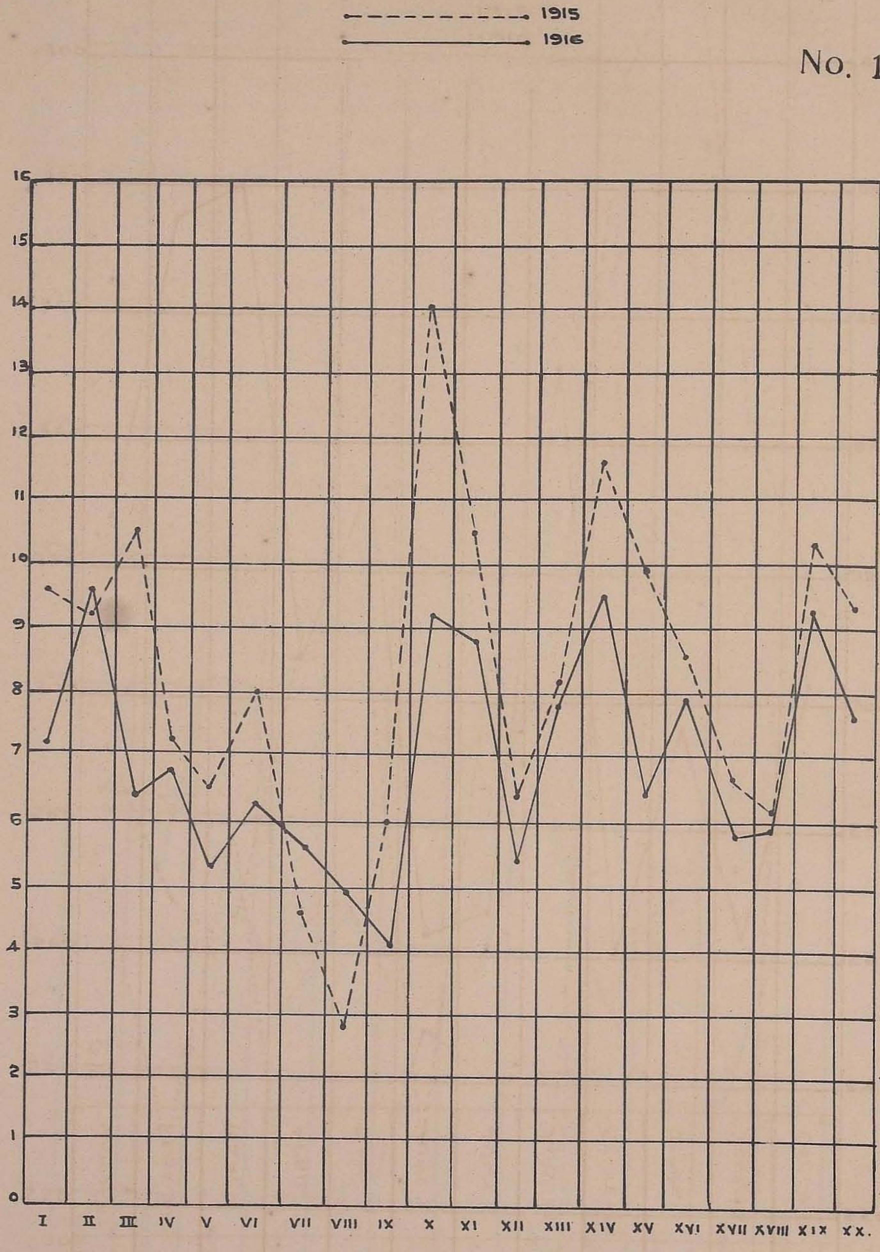
1917.

GRAPH SHOWING DEATH RATES OF DYSENTERY & DIARRHOEA FOR 1915 & 1916
ACCORDING TO DIVISIONS

No. 13.



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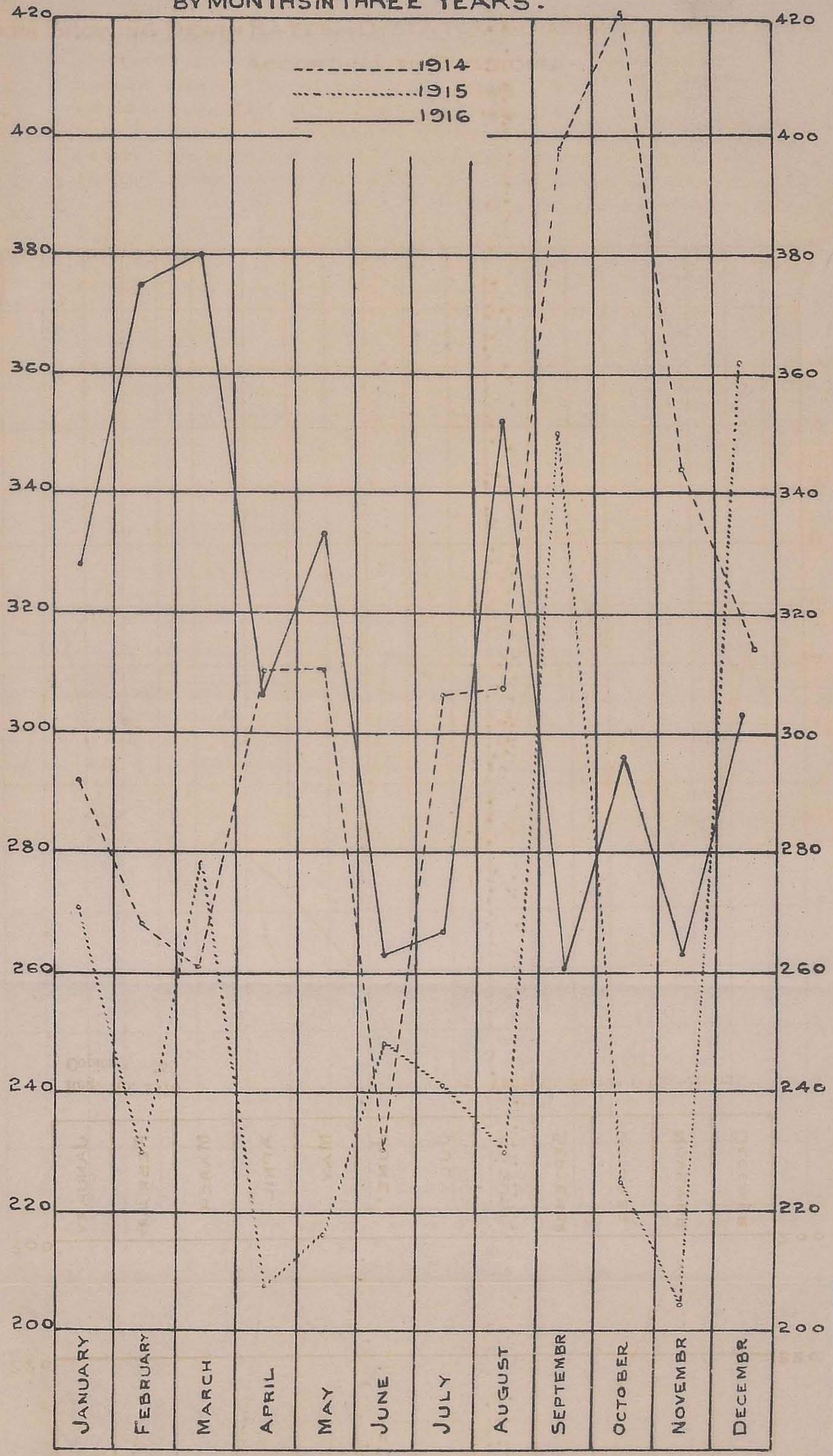
1917

No. 14

GRAPH SHOWING THE TOTAL DEATHS FROM RESPIRATORY DISEASES BY MONTHS IN THREE YEARS.



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Tuberculosis including Tubercle of the lung.

876 deaths were returned under this head with an increase of 117 deaths over the previous year. The ratio is 1·7 *per mille.* It does not appear to be fully recognised by the public that Tuberculosis is a 'dangerous' disease, and that some system of "control" of cases is necessary. This can only be effected by making the "notification" of this disease compulsory. The Tubercular Institute that was started during 1916 in this city is known to be doing excellent work. At present only out-patients are treated in this Institutute, and in order to extend its usefulness to the public of Madras an in-patient department and a big sanatorium are greatly needed.

Leprosy:

110 persons died from this disease. A number of lepers are known to have been employed in sweetmeat bazaars, bakeries, &c. Extension of the Leprosy Act into Madras is highly desirable; but this requires a much bigger asylum for lepers than the existing one.

Diarrhoea and Dysentary:

The number of deaths registered from these causes was 3,664. This represents a death-rate of 7·1 per 1,000 of population from bowel diseases alone, against 8·1 and 10·6 *per mille* during 1915 and 1914 respectively. The largest number of deaths was recorded in August and next in January and February. (*Vide* graphs Nos. 12 & 13). The mean ratio for previous five years was 9·5. It is equal to 20·5 per cent. of the total mortality as against 22·5 per cent. in 1915 and 22·8 per cent. in 1914.

General Respiratory Diseases. (excluding Tubercle of the lung) Table No. XV. (See graph No. 14).

2851 deaths were due to respiratory diseases or 548 deaths more than the previous year. The ratio is 5·5 *per mille* against 4·4 in 1915 and 5·8 in 1914. The largest number of deaths from respiratory diseases was in February and March. The slight increase in respiratory diseases during the year under review is perhaps due to the fact that the winter months were colder than usual. But, from this it does not always follow that the colder a season the greater should be diseases of the respiratory system. They do not often occur as a direct result from exposure to draughts, change of temperature, the chilling of the body or wetting in the rain, except in case of infants, the aged and people accustomed to still, warm air. The most important pre-disposing cause is breathing vitiated air, and living in rooms the air of which is rendered foul by overcrowding or accumulation of filth.

Diseases of the nervous system.

Of the 2,403 deaths registered under this heading 1,663 were those of the children under one year of age who were reported to have died of "convulsions." Of the remaining 740 cases, 44 deaths were registered as due to Puerperal Eclampsia, giving a death-rate from this disease, of 0·2 *per mille* of the female population. It is difficult to judge from these figures exactly the extent of mortality from nervous diseases and the figures are particularly liable to error in the case of infants. Nervous diseases are difficult of diagnosis even by medical men, and little reliance can be placed on returns from the lay public reporting "convulsions."

Certified Deaths.

The number of deaths certified by qualified medical men was 1,198 or 6·7 per cent. of the total number of deaths in the city. Of these 139 or 0·8 per cent. were certified by Private Medical Practitioners and 1,059 or 5·9 by Public Hospitals. The number of death reports made to the office by private medical men continues still meagre. Section 382 (1) of the Madras City Muni-

cipal Act says "Any medical man in attendance during the last illness of any person dying in the city shall within three days of his becoming aware of the death of such person send a notice to the Corporation." Unfortunately in a large majority of cases the medical man in attendance during the last illness does not become aware of death, and send in a timely report of the death and its cause. The fact is that in some instances several medical men are called in consultation during the course of illness of a patient, so that no one practitioner is in charge of the case at the last moment; in others the case is transferred by the relatives to the care of a quack who pleads ignorance of the laws. The system of "family doctors" does not obtain in this country, and this adds to the difficulty of correct and timely reports. As the importance of death reports lies not merely in their registration but in the accurate diagnosis of the cause or causes of deaths, I appeal to all Medical Practitioners of Madras to co-operate with this Department by reporting early or late all cases of death that they become aware of.

Extracts: of Birth and Death Registers.

195 applications were received during the year for extracts of entries from the Birth-Registers and 232 from Death-Registers. Out of these the number of birth-extracts granted was 144 and of death-extracts 193. In 73 cases extracts were not granted as the parties failed to pay the prescribed fees. In 17 cases entries were not found and the parties were accordingly informed. The fees collected during the year for such extracts amounted to Rs. 605.

The registration of births and deaths is becoming more and more popular and there is a continued demand for authenticated certificates. The following table gives the total number of such certificates granted from 1912:—

	Births.	Deaths.	Total.
1912	102	221	323
1913	109	275	384
1914	143	312	455
1915	110	181	291
1916	144	193	337

Burial and Burning Grounds.

The number of Corporation Burial and Burning grounds remained the same as in the previous year. These burial grounds continued to be under the charge of the Sanitary Inspectors of the respective divisions.

Of the 17,872 deaths during the year 14,188 were buried and 3,684 were burnt. Burying is the more popular mode of disposal of the dead. Considering the clayey nature of the soil in most of the large burial grounds and the sluggishness of the sub-soil drainage it will be seen that the location of some of the burial grounds is not satisfactory and arrangements should be made to open new burial grounds at a distance from the inhabited localities.

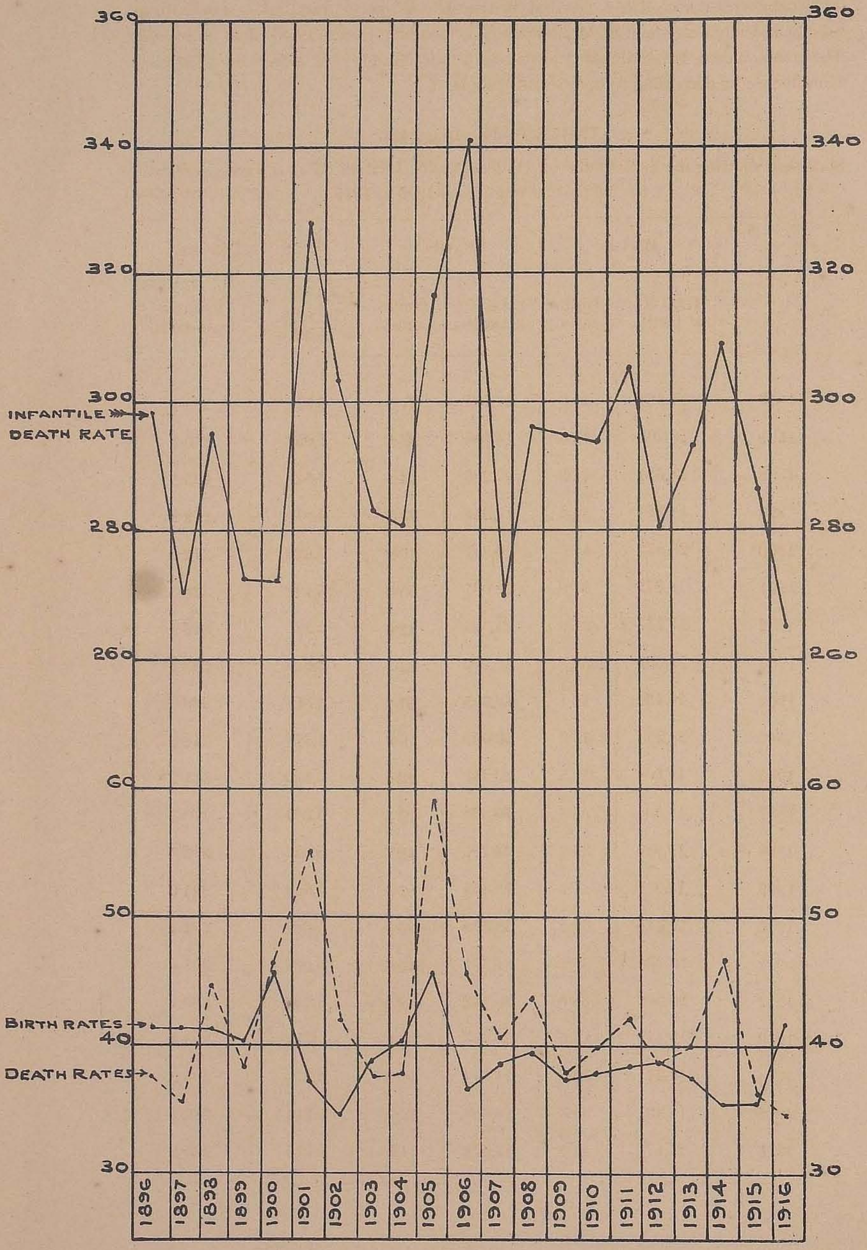
Lands for the erection of tombs were sold to 92 applicants during 1916, the amount collected being Rs. 541-8-0.

Prosecution.

During the year the number of prosecutions instituted for failing to register births and deaths within the time allowed by the Act was nil for births and four for deaths. One M., a young man. went to one of our Medical Registrars and reported that his father was dead and that he was buried in one of the certified burial grounds. The Medical Registrar having not received the burial ground chit for this reported death, went to verify the report. He found the dead man alive and well. The cause alleged for this false report was "family disturbances and excitement," and no more information than this was available. The man was prosecuted and fined Rs. 5. Convictions were obtained in all the five cases prosecuted.

GRAPH SHOWING THE BIRTH, DEATH & INFANTILE DEATH RATES FOR THE PAST 20 YEARS FROM 1896 TO 1915 AS COMPARED WITH THOSE OF 1916.

No. 15



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Vandyke, Survey Office, Madras.
1917

Variation of Population.

From a reference to Table P. it will be seen that except during the years 1903 and 1904 death-rates have been higher than birth-rates throught the period between 1901 and 1915; and from this one might be led to infer that there is a tendency for the population in Madras to show an actual decrease instead of a "natural increment." Why our birth-rates should have been persistently lower than the death-rates is a question easier asked than answered. The common causes of diminishing birth-rates in any locality are either by increasing unheathiness or decreasing fecundity of its people.

TABLE P. (See Diag. 15).

Statement showing the total number of Births, Deaths, Infantile Mortality with their rates for the past 20 years from 1896 to 1915.

Years.	Births.		Deaths.		Infantile Deaths.	
	Total No. of Births.	Birth-rates.	Total No. of Deaths.	Death-rates.	Total No. of Infantile Deaths.	Infantile death-rates.
1896	18,684	41·2	17,131	37·8	5,570	298·1
1897	18,702	41·3	16,086	35·5	5,052	270·1
1898	18,694	41·3	20,286	44·8	5,525	295·5
1899	18,220	40·2	17,248	38·1	4,973	272·9
1900	20,672	45·6	20,937	46·2	5,624	272·0
1901	18,872	37·0	28,031	55·0	6,197	328·3
1902	17,743	34·8	21,395	42·0	5,393	303·9
1903	19,830	38·9	19,205	37·7	5,618	283·3
1904	20,439	40·1	19,305	37·9	5,742	280·9
1905	23,263	45·6	30,060	59·0	7,359	316·3
1906	18,608	36·5	23,749	46·6	6,350	341·2
1907	19,808	38·8	20,638	40·5	5,364	270·7
1908	19,980	39·2	22,285	43·7	5,922	296·3
1909	18,981	37·2	19,354	37·9	5,600	295·0
1910	19,340	37·9	20,312	39·8	5,687	294·1
1911	19,735	38·3	21,771	42·0	6,027	305·4
1912	20,099	38·8	20,132	38·8	5,628	280·4
1913	19,470	37·5	20,675	39·9	5,713	293·4
1914	18,241	35·2	24,174	46·6	5,635	308·9
1915	18,331	35·3	18,688	36·0	5,244	286·1
1916	21,675	41·8	17,872	34·5	5,746	265·1

That the health of Madras is not as good as it should be, may be admitted. But there is no reason to believe that the City is showing any increasing unhealthiness during these 14 years, nor is there any reason to believe the fecundity of the average Madrasee is diminishing; Table C shown on page 12 *supra*, shows that the birth-rate calculated on the married female population is higher than in other Provincial Towns. It is extremely probable that registration of births was imperfect, and these low birth-rates were more apparent than real. As to increase due to mechanical causes (immigration) it is a difficult matter to estimate with any pretence to accuracy the exact part played by this group of causes.

Infectious Diseases Hospitals.

There are two Infectious Diseases Hospitals in the City of Madras, maintained by the Corporation, one at Krishnampet under the supervision of the Surgeon, IV District and the other at Old Jail Street, under the Surgeon, I District.

The following is the report of the Isolation Hospital, Krishnampet, for the official year 1916-17.

The hospital consists of four main blocks of buildings having accommodation for 44 patients. Of these, two blocks are set apart for European patients and two for Indian patients. The former has accommodation for 12 beds and the latter for 32 beds. Besides there are eight temporary sheds put up for Plague and Cholera patients.

The staff consists of one Assistant Surgeon, one Nurse, one ward boy, one ayah, one male toti, one female toti, one gardener and one dhoby. Temporary servants are employed as occasion arises.

The following table shows the diseases treated during the year :

Diseases.	Remained on April 1916.	Admitted during the year.	Discharged.	Died.	Remaining on April 1917.
Cholera	...	4	2	2	...
Plague	...	15	3	12	...
Small-pox	29	180	161	19	29
Chicken-pox ...	2	62	64	...	...
Measles	3	32	35	...	...
Mumps	...	23	23	...	...
Other diseases ...	...	10	10	...	...

The expendiiure for the year was as folloows :

	Rs.	A.	P.
Establishment (Medical Officers, Nurse and servants) ...	2,551	11	6
Diets	1,735	6	8
Contingencies and Clothing	595	9	11
Medicines	106	14	0
Building repairs	464	2	4
Total ...	4,953	12	5

C. DONOVON, Lt.-Col., I.M.S.,

Surgeon, IV District.

The following is the report of the Infectious Diseases Hospital, Old Jail Road Madras, for the official year 1916-17.

At the beginning of the year one block of buildings, the old Regimental hospital situated in the Old Jail Road, Madras, was fitted and equipped for the infectious diseases. It accommodated 32 patients, but the arrangement of the available beds in two large wards did not permit of segregation of different diseases. It was decided to limit the existing block to the treatment of Cholera cases and the Corporation took in hand a long block of buildings, the old Regimental Barracks and expeditiously and efficiently converted them into a series of wards, each with its own bath room provided with water taps etc. The accommodation now consists of a Cholera block, which is provided with 28 cots and in an epidemic could receive about double that number. This block is self-contained, and can be run quite independently, also a long building at right angles to the Cholera block, quite apart from it with a kitchen of its own, which has been divided into a series of wards.

The second block is divided into wards as follows :—

Race.	Class of Diseases.	Men.	Women and Children.	Total.
Europeans and Eurasians ...	Small-pox ...	4	4	8
Indians	Do ...	14	14	28
Europeans and Eurasians ...	Chicken-pox and Measles.	2	2	4
Indian	Do ...	14	14	28

The average daily sick for all infectious diseases is shown in the following table :—

	Men.	Women.	Children.	Total.
Average daily sick ...	·45	·49	·38	1·32

The maximum number of cases treated on the 4th March 1917 was 95.

The following table shows the diseases treated in the hospital during the year 1916-17.

	No. treated in 1916-17.
Small-pox	294
Measles	4
Contacts	94
Chicken-pox	80
Other diseases	3
Plague	1
Cholera	5
Total ...	481

Statement showing the diseases treated in the undermentioned hospital and dispensary during the year 1916-17.

Hospital and dispensary.	Name of disease.	Total.
Infectious Diseases Hospital Old Jail Road Madras	Cholera	5
	Small-pox	294
	All other infectious diseases (including contacts).	182
	Grand total.	481

Operations 3.

Establishment consists of the following :—

1. Fourth Grade Sub-Assistant Surgeon,
2. One European nurse
3. One Indian midewife.
4. One clerk.
5. Two male ward attendants.
6. Two female ward attendants.
7. Two male toties.
8. Two female toties.
9. Two male sweepers.
10. Two female sweepers.
11. Two cooks.
12. One Office peon.
13. Two gate peons.
14. One dhoby.

The total admissions treated during the year was 481.

Three Operations were performed during the year.

Special Funds.—Patients when leaving the hospital pay of their own free will whatever they can. A balance of Rs. 12-5-0 collected in this manner remains on hand on the 31st March 1917.

Statement showing the attendance of patients treated, income and the Expenditure of the under mentioned Hospital and dispensary for the year 1916-17.

Name of Hospital.	Total number.		Average daily Attendance.		Percentage of deaths to total in-door treated.	Income.			Expenditure.						Total.
	In-door.	Out-door.	In-door.	Out-door.		From subscription, &c	From Government	From Municipality.	Establishment.	Diets.	European Medicines.	Bazaar Medicines.	Miscellaneous.	Repairs to buildings, &c.	
Infectious Diseases Hospital.	481	...	1·32	...	8·10	...	...	Rs 23,805-8-7	„ 3,091-14 3	„ 1,698-9-2	„ 415-0-0	„ 188-2-10	„ 4,810-6-0	„ 13,601-8-4	„ * 23,805-8-7

* This includes also cost of repairs to Buildings

General Remarks.—The hospital is a temporary make shift, a stop gap, till the Corporation decide on building an Infectious Diseases Hospital.

The Corporation has done everything asked of them to enable the staff to meet the needs of the North end of Madras—so far there has not been any great strain on the accommodation or the organisation.

From the figures it will be seen that it has done a certain amount of good work so far as patients are concerned.

In case of an epidemic of Cholera it is understood that the present menial staff which is trained in Cholera duties will be transferred to the Cholera block and a supplementary staff will be entertained for any cases of Small-pox, &c., in the other block.

R. BRYSON LT.-COL. I.M.S.,
Surgeon, 1st District.

Infantile mortality.

The registered number of deaths among infants under one year of age in 1916 was 5,746 against 5,244 in 1915 and 5,635 in 1914. The mortality rate when stated as a proportion of deaths of infants under one year of age to the total number of births registered is found to be 265·1 in 1916, 286·1 in 1915 and 308.9 in 1914. The figures in Table P. shows that the infant mortality rate is the lowest on record for the past 20 years.

Infant mortality by sex.

Of the 5,746 deaths, 3,052 were male and 2,694 female infants *i.e.*, a ratio of 113.2 males to 100 females.

Infant Mortality by Race or Caste.

From Table Q. it will be seen that the infantile death-rate among Muhammadans was the highest *viz.*, 281·1 per 1,000 births and the lowest amongst Europeans being only 70 per 1,000 births. Table R. shows the birth-rates and the infantile death-rates in the different communities of the Hindus for 11 years including 1916. It will be seen therefore that on an average the birth-rate and the infantile death-rates are both lowest among Brahmins, in spite of the well-known customs of early marriages.

TABLE Q.

Table shows the Infantile Mortality by Race and Infantile Death-rates on 1,000 Live Births during the years 1914, 1915 and 1916.

Race or Caste.	Deaths under one year in 1916.	Number of Births registered in 1916.	Infantile Mortality per 1000 of births in the Race (1916).	Infantile death-rate in 1915.	Infantile death-rate in 1914.
Europeans ...	7	100	70·0	71·4	92·1
Anglo-Indians ...	45	377	119·4	197·2	162·1
Indian Christians ...	189	1,070	176·6	174·0	282·6
Hindus ...	4,773	17,522	272·4	295·6	303·0
Muhammadans ...	732	2,604	281·1	294·2	387·3
Others ...	...	2	...	...	...
Total ...	5,746	21,675	265·1	286·1	308·9

TABLE R.

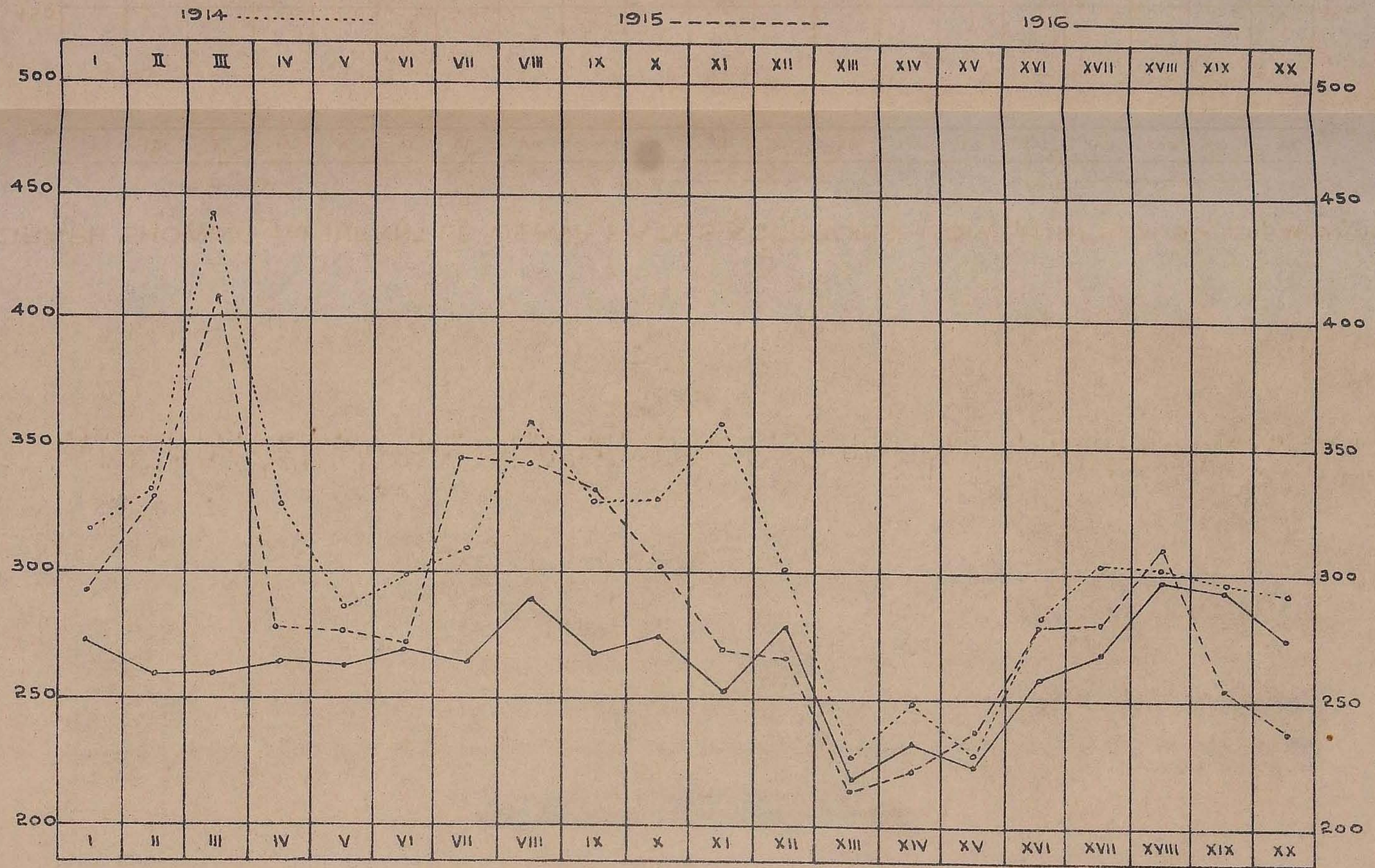
Statement showing the Birth-rates and Infantile Death-rates of the principal Sub-Divisions of the Hindu Community for 11 years.

Principal Sub-Divisions of the Hindu Community.	Population (Census 1911).	1906.		1907.		1908.		1909.		1910.		1911.		1912.		1913.		1914.		1915.		1916.	
		Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.	Birth-rate.	Infantile Death-rate.
Brahmin	32,727	1·23	39·65	2·30	17·31	1·85	27·84	1·67	30·66	1·96	26·28	2·50	21·54	2·18	25·56	2·67	22·31	2·28	27·75	2·61	20·73	2·82	20·78
Chetti	36,414	2·25	37·12	2·57	23·40	2·14	35·17	1·91	36·02	2·73	35·51	2·35	32·79	2·35	37·70	3·09	29·84	2·64	33·82	3·62	22·06	3·42	25·54
Vellalah or Mudaliar ...	66,551	3·05	32·10	3·41	27·58	2·67	39·29	3·25	30·80	3·34	31·08	3·14	32·87	3·26	33·13	3·70	27·06	3·19	33·19	3·57	25·54	3·93	25·55
Balijah or Naidu ...	47,811	2·72	37·23	3·14	32·33	2·52	43·03	2·42	38·09	2·92	37·51	3·31	29·42	2·87	34·53	3·34	27·18	3·27	29·37	3·08	29·64	3·50	25·60
Vanniah or Naicker ...	50,209	3·58	45·91	3·53	36·55	3·60	42·26	3·46	36·56	4·17	31·63	3·98	30·95	4·31	31·17	4·65	27·81	2·98	44·31	3·10	36·31	4·84	29·04
Pariah	59,651	2·26	53·71	2·71	38·74	2·23	57·23	2·66	40·82	2·36	49·72	2·64	36·95	2·47	46·13	3·49	31·53	3·53	34·93	3·63	28·93	4·67	27·29
Patnawar	9,799	2·94	79·17	5·25	31·13	4·16	47·55	3·99	53·97	4·21	49·88	6·12	30·83	4·45	44·95	5·94	28·87	5·09	33·87	6·37	28·37	4·51	32·81
Yadaval or Idayar ...	14,308	3·04	41·97	5·12	25·38	2·96	44·92	3·29	33·97	3·35	36·38	5·14	21·33	3·47	32·66	9·20	14.27	3·41	34·22	5·69	18·16	4·27	30·61
Visva Brahmin or Kammalar	15,626	3·46	42·96	4·25	32·38	4·31	29·67	4·42	31·11	4·02	30·52	6·25	19·57	4·17	29·60	5·08	22·17	3·72	26·46	5·74	23·19	4·53	29·66

☞ Birth-rate calculated on the population of each community.
Infantile Death-rate calculated on the live Births of each community.

No. 16

GRAPH SHOWING THE INFANTILE DEATH RATES ACCORDING TO DIVISIONS FROM 1914, 1915 AND 1916



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Vandyke, Survey Office, Madras.
1917

Infant Mortality according to Municipal divisions.

From graph No. 16 and Table S. it is seen that the highest death-rate of 296·9 is recorded in the 18th Division and 19th Division stands next. The lowest rates were returned for the 13th Division. These rates have to be accepted with great caution. There are many factors involving the introduction of an element of error and rendering the discussion of infantile mortality on divisional basis uncertain. The difficulty in the way of satisfactory registration of births, the intersectional movements of the population, the inflation of infant mortality rates due to outborn infants dying in the City, are some of the prominent factors which influence the variations of infantile death-rates in different sections of the City.

TABLE S.

Ratio of deaths among children under one year per 1,000 Live births registered in each division during 1916.

Municipal Divisions.	Ratio of Deaths		
	1916.	1915.	1914.
1	272·5	291·0	316·8
2	258·6	328·1	332·0
3	259·6	407·1	440·6
4	263·8	277·3	325·4
5	261·1	272·0	285·2
6	268·6	270·8	299·3
7	263·2	344·0	309·2
8	289·0	341·3	359·9
9	265·2	331·6	326·1
10	274·6	301·9	327·7
11	251·3	269·8	358·0
12	277·1	265·9	302·1
13	216·7	213·9	226·7
14	231·3	220·5	248·0
15	223·3	237·2	225·1
16	257·2	277·7	281·9
17	267·5	279·8	303·4
18	296·9	309·2	301·9
19	293·4	253·8	295·0
20	274·8	236·4	291·7
Total ...	265·1	286·1	308·9

That the infantile death-rates were comparatively high in the 18th and 19th Divisions is not surprising if it is remembered that Small-pox was very virulent during 1916 in this part of Madras. It is not at all unlikely that in a number of cases where death occurred early in the cause of the disease, the all-too-accommodating "fevers" or "infantile convulsions" were returned as causes.

Table T shows the infantile mortality in 1916 according to months compared with the figures of the corresponding months of 1915.

TABLE T.

Table of Infant Mortality by Months in the year 1916.

Months.	Debility.	Nervous Diseases.	Respiratory Diseases.	Intestinal Diseases.	All other causes.	TOTAL. Males.	TOTAL. Females.	TOTAL. Total.	1915 all causes.
January ...	13	177	76	96	161	296	227	523	492
February ...	14	119	91	86	170	248	232	480	422
March ...	11	122	76	96	192	253	244	497	515
April	16	136	92	89	161	271	223	494	258
May	14	164	97	105	139	271	248	519	347
June	12	112	56	91	107	200	178	378	453
July	17	154	64	97	157	249	240	489	421
August ...	11	133	103	85	186	264	254	518	491
September ...	17	143	65	72	164	251	210	461	512
October ...	14	139	69	60	147	238	191	429	359
November ...	18	133	82	60	178	246	225	471	354
December ...	14	131	81	103	158	265	222	487	520
Total ...	171	1,663	952	1,040	1,920	3,052	2,694	5,746	5,244

Infantile deaths by age periods from Principal causes :—

TABLE V.

Table of deaths among infants under one year of age from principal causes by age periods in the year 1916.

Age periods.	Plague.	Small-pox.	Measles.	Malaria.	Ague and Remittent fever.	Dysentery and Diarrhœa.	Premature births.	Debility.	Nervous system.	Respiratory System.	All other causes.	Total.	Percentage of deaths in each age period to total deaths under one year of age.
Under 7 days ...	...	...	...	...	...	8	913	119	516	47	148	1,751	30·47
7 days and under 1 month ...	...	...	5	...	1	58	105	83	414	68	83	817	14·22
1 month and under 3 months ...	...	1	4	1	2	100	5	26	296	137	199	771	13·43
3 months and under 6 months ...	1	10	18	2	2	250	2	17	283	250	92	927	16·13
6 months and under 9 months ...	...	34	32	4	11	318	...	4	92	256	70	821	14·29
9 months and under 12 months ...	...	20	19	6	9	306	...	2	62	194	41	659	11·47
Total ...	1	65	78	13	25	1,040	1,025	251	1,663	952	633	5,746	...

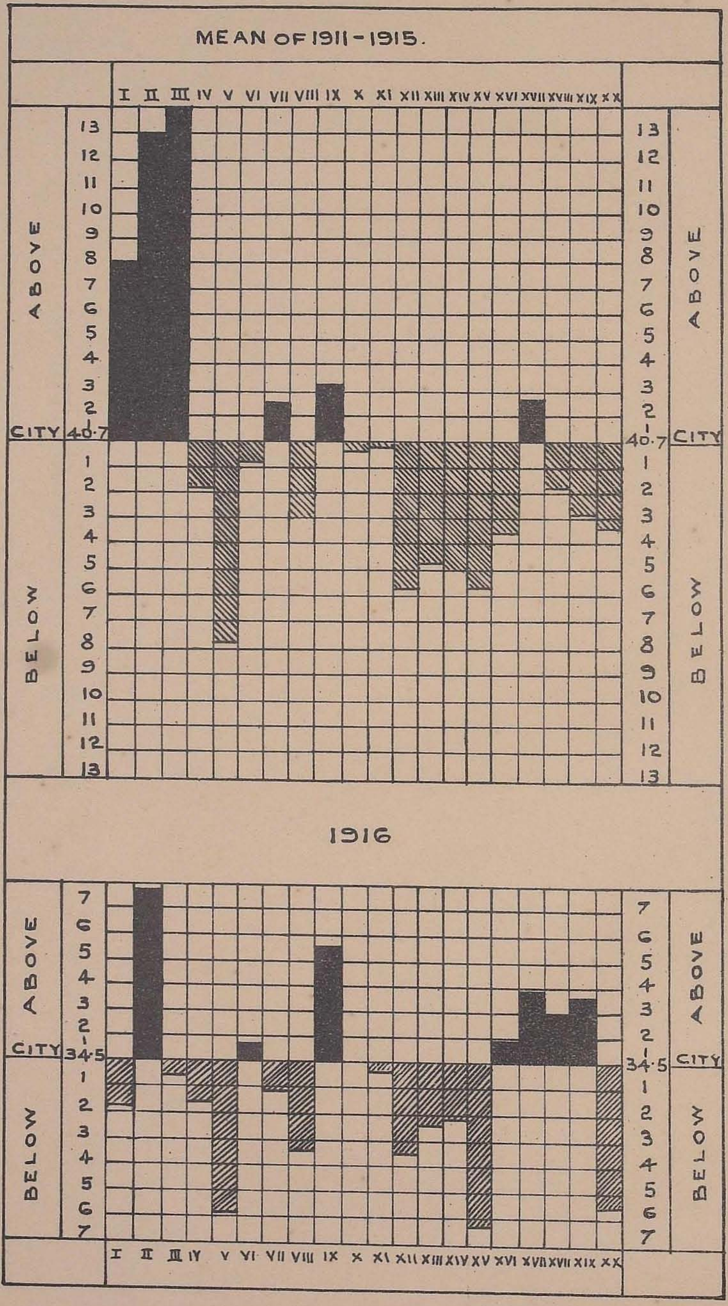
TABLE X.

Table of precentages of infant deaths from principal causes in the year 1916.

Age periods.	Plague.	Small-pox.	Measles.	Malaria.	Ague and Remittent fever.	Diarrhœa and dysentery.	Premature births.	Debility.	Nervous system.	Respiratory system.	All other causes.	Total.
Under 7 days	...	...	...	...	...	0·46	52·14	6·79	29·47	2·68	8·45	30·47
7 days and under 1 month	...	...	0·61	...	0·12	7·10	12·85	10·16	50·67	8·32	10·16	14·22
1 month and under 3 months ...	...	0·13	0·52	0·13	0·26	12·97	0·65	3·37	38·39	17·77	25·81	13·43
3 months and under 6 months ...	0·11	1·08	1·94	0·22	0·22	26·97	0·22	1·83	30·53	26·97	9·92	16·13
6 months and under 9 months ...	...	4 14	3·90	0·49	1·34	38·73	...	0·49	11·21	31·18	8·53	14·29
9 months and under 12 months ...	...	3·03	2·88	0·91	1·36	46·43	...	0·30	9·41	29·44	6·22	11·47
Total ...	0·02	1·13	1·36	0·23	0·44	18·10	17·84	4·37	28·94	16·57	11·02	...

Comparison of Total Death Rates of the City and Component Divisions

No. 17



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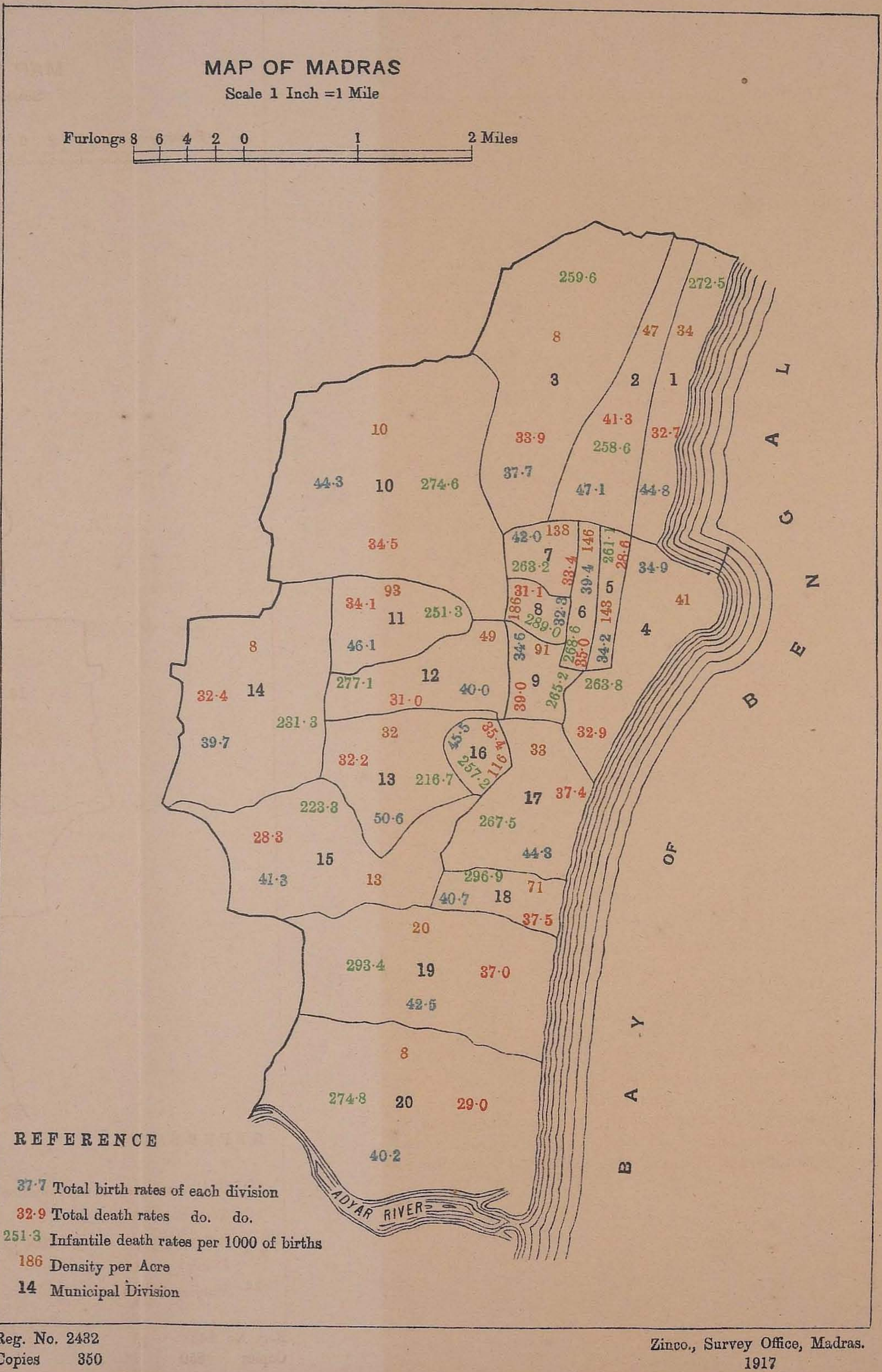
1917

No. 18



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Zinco., Survey Office, Madras.
1917

From the above tables it will be seen that as many as 2,568 infants died before they reached the age of one month. Of these 2,568 deaths as many as 1,220 or 47·5 per cent. died from premature birth and debility; or expressed in terms of total infantile mortality, these causes alone are responsible to 21·2 per cent. Diarrhœa and Dysentery caused only 66 deaths or 1·15 per cent. of the total and occupied the lowest place among the principal causes of infant deaths.

In age group one to six months, 1698 infants or 29·5 per cent. of the total died. Diseases of the " nervous system," mostly registered as " convulsions," occupy the first place amongst the factors causing mortality—579 deaths being equal to 34·1 per cent. of the deaths at this age group or 10·07 of the total. Next in incidence are " Respiratory" and "Intestinal," which account for 387 and 350, respectively.

1,480 infants or 25·8 per cent. died in the age group 6-12 months. Of these 624 or 42·2 per cent. died from Diarrhœa and Dysentery and 450 or 30·0 per cent. from Respiratory causes that is equal to 10·8 per cent. and 7·9 per cent. of total infantile deaths, respectively.

These deaths are largely due to ignorance with regard to " child Hygiene" and " care of infants". This ignorance in association with abject poverty means that the children are exposed to the vicissitudes of the weather, not properly taken care of during trivial illnesses, fed with impure and unwholesome food, especially dirty milk.

The following table shows the ratio of infant deaths per 1,000 births under the principal causes of deaths and in the 3 age groups noted above.

—	Premature births and debility.	Nervous system.	Respiratory diseases.	Diarrhoea and Dysentery.	Infectious diseases	All other causes.	Total.
0—1	56·3	42·9	5·3	3·0	0·3	10·7	118·5
1—6	2·3	26·7	17·9	16·1	1·9	13·4	78·3
6—12	0·3	7·1	20·7	28·8	6·2	5·1	68·2
All under one year of age.	58·9	76·7	43·9	47·9	8·4	29·2	265·0

Infantile Mortality and Birth-rates.

A high birth-rate denoting as it does a large number of newly born children among whom mortality is high may lead to a large amount of infantile deaths. In other words a high birth-rate has a tendency to lead to a high infant mortality, *i.e.*, the actual number of infant deaths for the year. But in as much as infant mortality *rates* are calculated on the number of births during the year it follows that, other things being equal, the higher the birth-rate, the lower would the infant mortality *rate* tend to become. Thus a high birth-rate may lead to a high infant mortality but not necessarily to a high infant mortality rate; and there would be nothing surprising in the association of a high infant mortality with a low *rate*. In fact this is exactly what has happened in Madras during 1916; for, with the highest birth-rates for these ten years, *viz*.,

41·8 *per mille* we have the infant mortality rate of 265·1 per 1,000 births which is the lowest recorded for 20 years, although the number of infants that died was higher (5,746) than in 1914 (5,244).

Density, Birth-rate and Infant Mortality.

Birth-rate is said to be high in 'slum areas' and among the poor generally; and so is infantile mortality rate. The relationship of overcrowding to high infantile mortality may be admitted; but the census density of so many people per square acre may be no true index of overcrowding. And a high degree of density of population may not be associated with a correspondingly high degree of infantile death-rate or birth-rate. Certainly it is not so for the City of Madras. The density of population in a division calculated on the area of the division does not express the whole truth. A division may show a low density because it has large uninhabited open areas; and yet the remaining inhabited area may show great overcrowding. For example, the area of the 8th Division is 0·24 square mile with a population of 28,585 while that of 14th Division is 2.40 sq. miles with a population of 11,751. According to this the density of the 8th Division is high, (186 per acre), and that of 14th Division is but 8 per acre. Still the birth-rate in the former division is lowest amongst the divisions of the city being 32·3 *per mille,* while that in the 14th Division is comparatively high being 39·7. To take another example the 16th Division of Chintadripet, 5th from the standpoint of high density of population (116 per acre) has a comparatively low infantile mortality. For a correct idea of density of population or overcrowding it is necessary to take a census of occupied tenements and the number of persons occupying each variety of such tenements. In this connection the following remarks of Dr. A. Newsholme regarding the true relationship between infantile death-rates and density of population are very much to the point. "The number of rooms occupied by each family is of much greater importance in relation to health than the number of persons living on a given acre, as this fact throws important light on the state of each tenement as regards overcrowding. Given houses properly constructed and drained, and given cleanly habits on the part of the tenants, increased aggregation of population on a given area has no influence in raising the death-rate, except in so far as it is accompanied by *over crowding in individual rooms,* an event which is by no means necessary under the circumstances named. In other words, there is no causal relationship between density of population *per se* and a high mortality. The true index of density is the number of persons to each occupied room."

Death and Death-Rates.

Density and General Death-rates.

Death-rates generally vary in direct proportion with overcrowding but here again the density of population should be calculated not by the standard of dividing the square area of a division or part of Madras by the number of persons inhabiting therein but by the number of persons in each tenement. To a casual observer the figures put up in Table II, See diag. 17 & 18, showing death-rates by divisions would convey an impression that density has no bearing in Madras statistics on general deaths. According to this calculation 2nd Division with a density of 47 per acre has returned the highest mortality while 5th Division with a density of as much as 143 per acre stands last but one in the list of divisional mortality. The explanation is simple: the 2nd Division as *a whole* is sparsely populated but those portions of it which are populated are very densely populated indeed.

2. SANITATION.

Sanitary Inspectors.

Only 19 out of the sanctioned 20 Inspectors were in employment during the year and thus one Sanitary Inspector was in charge of two divisions; the 14th and 15th Divisions (Kilpauk and Nungumbaukkam Divisions) being combined for this purpose. This arrangement is not satisfactory and it is hoped that the full complement will be maintained hereafter. The work of the Sanitary Inspectors has on the whole been satisfactory; there is increasing evidence to show that they are now realising the fact, that their duties do not begin and end by serving notices on the citizens to do this or not to do that, but that they themselves should answer all legitimate queries regarding the why and wherefore of the acts or forbearances demanded by the notices and persuade the citizens to the belief, that it is in the best interest of themselves and their neighbours, that they are asked to adopt the particular course suggested.

The Routine Work of a Sanitary Inspector.

The Sanitary Inspector is the man on the spot, who is responsible for the good sanitation of the division in his charge. He is the official who starts an action, whenever such action is deemed necessary. The routine followed by the Sanitary Inspector is somewhat as follows :—

As soon as he becomes cognisant of any nuisance, sanitary defect, etc., committed or existing in any place, he draws the attention of the occupier or owner to the existence of such nuisance or sanitary defect, etc., and asks that the same may be removed. If the request is complied with there is nothing more to be said about it, except an expression of our heart-felt gratitude. If it is not, as is very often the case, he issues a notice upon the said occupier or owner, under the appropriate section or sections of the Municipal Act, requiring him to comply with the terms of the notice within the time specified in the notice. The Sanitary Inspector is also expected to visit the place off and on within the period of time fixed, and to induce and help the party to comply with the terms of the notice. The party may comply with the terms, or may not. If he does, there is nothing more to be said about it; if he does not, he is served with one or two reminders drawing his pointed attention to the continued existence of the nuisance or sanitary defect, requiring that the same may be remedied. Perhaps objections of all sorts are raised at this stage. If well founded, the objections will be met with as far as possible, and further opportunity given to the party to comply with the modified terms. If the objections are unreal, or if the party fails to comply even with the modified terms, he is prosecuted, always with the special permission of the head of the department. Of course, prosecutions are not always persued to convictions; it not infrequently happens, that the terms of the notice are complied with in the interval between the date when the case is filed before the Magistrate and the date of hearing; in such case, proceedings, as a rule, are dropped.

Convictions are very distasteful to the sanitarian. His work is to be judged not by the proportion of prosecutions to convictions, but by the proportion of cases not prosecuted, and if prosecuted, by that of cases withdrawn.

Food Inspectors.

In the absence of a proper laboratory and other arrangements for analysing the samples obtained by our Food Inspectors, there did not seem to be any special need for the entertainment of full time Food Inspectors. The post of Food Inspector, South Range, has therefore been

temporarily abolished since 1st June 1916 and " the inspection of food and drinks " has been made a part of the ordinary duties of the Divisional Sanitary Inspectors of this range. This arrangement having been found to work smoothly, it has recently been decided to adopt the same plan for the Northern Range also.

Drainage.

The provisions of sections 218 and 221 relating to drainage were for the most part carried out by the Works Department in conjunction with the Health Department. The extent to which they were worked during the year will be seen from the following statement of notices and prosecutions. Under section 218, 4 notices were pending disposal at the commencement of the year ; 46 were served during the year. Of these, 6 notices were voluntarily complied with by parties, 1 by prosecution, 1 transferred to the Works Department for execution and recovery of cost, 31 cancelled and the remaining, *viz*, 11 await disposal.

Sewers with house connections, silt catcher buckets and syphon boxes, were laid at the following places :—

1. Naval Hospital Paracheri Lane.
2. Kammala Street.
3. Mount Road, near Thousand Lights.
4. Thousand Lights Paracheri.

A storm-water drain at Sheik Maistry Street at a cost of Rs. 3,830 was constructed. Side drains on both the western and eastern sides of Rama Naick Street, Nungambakkam, Pulianthope Road near Anjuman premises and Choolai Bazaar Road were newly constructed, during the year under report. The side drains opened at Valluvan Tholasingam Mudali Street, in the 19th Division, were connected with the sewer in Mundakanni Ammen Coil Street, Mylapore. The work of covering a portion of the masonry drain in Peter's Road, as also the construction of a 12 inch pipe drain in Graems Road were under progress during the year. The drain in Brick-kiln Road was cleaned and deepened, and the drain at the junction of Brunton Cotton Press Road and Mannaraswamy Coil Street, and the main drain at Langs Garden Road were repaired.

Relief of Congestion.

Compared with previous years, there was a perceptible decrease in the number of acquisitions for the widening or opening of streets.

Flush-out Latrines.

In paragraph 157 of the report for 1915 it was stated that the construction of flush-out latrines was started in a number of places. During the actual year under review only one was completed, *viz.*, the one at the junction of the Mint Street with Basin Road, while the rest were not finished until the opening months of 1917 on account of the delay in getting necessary materials, especially suitable stone-ware pipes.

A list showing the situation of each of these is given below :—

In all but one *viz.*, that at the junction of Thambu Chetti Lane with Sheik Maistry Street, the old sanded latrines were altered into flush-out ones.

1. Cemetry Road.
2. Narayanappa Naick Garden Street.
3. Periya Thambi Street, Kasimodu Garden.
4. Palmyra Kuppam.

5. Sheik Maistry Street.
6. Mottai Garden.
7. Kasimodu, near Flag Staff Street.
8. Junction of Sheik Maistry Street and Thambu Chetti Lane.
9. Angalammen Koil Street.
10. Kandappa Mudali Street.
11. Swami Reddi Street.
12. Cooum-river-side Road.
13. Kuppam Hutting grounds ; and
14. Sirdar Jung's gardens.

The Torfit urinal constructed at the entrance to the Wall Tax Road opposite to the General Hospital does not appear to have been freely used by the public way-farers. The reason is, perhaps, that it is in a corner with a cart-stand close by. The jutkas and carts not only obstruct the passage to the urinal, but also screen it from public view. A notice board was placed in a conspicuous place nearby, and still it has not attracted public attention.

During the year, the provision of latrines by persons employing workmen, or labourers, by owners or occupiers of dwelling houses, of markets and of cart-stands, was insisted on. 105 notices under sections 224, 225, and 226 remained pending at the beginning of the year and 263 were served during the year ; 130 were voluntarily complied with, 59 after prosecution ; and 80 were either cancelled or withdrawn. The remaining 99 were pending disposal at the end of the year. Under section 227, 29 notices were carried over from 1915 and 122 were issued during the year. Of these, 70 were voluntarily complied with, 5 cancelled, while the remaining 76 stood over.

Building Regulations.

The disposal of building applications has been transferred to the Works Department who scrutinise them in accordance with the rules and bye-laws framed under the Municipal Act. It is special cases that are referred to this department ; 137 applications were thus referred during the year under report.

Prohibition of Accumulation of filth, and allowing sewage to flow in Streets.

Under section 300, sub-sections 5 and 6, one notice was carried over from 1915 and 203 were served during the year. Of these, 173 were voluntarily complied with, 13 after prosecution ; and 3 more, either cancelled or withdrawn. 15 thus remained undiposed of at the end of the year.

Unwholesome sources of Water-Supply and Stagnant water (sections 301 to 304), Tanks, Wells, Pits, Ponds, Pools, &c.

163 notices were served during the year in addition to 105 carried over from 1915. Of these, 106 were complied with voluntarily and 59 only after prosecution. 5 were forwarded to the Works Department for execution of work and recovery of cost, 48 cancelled or withdrawn and 50 remained undisposed at the end of the year.

Abandoned Places.

9 cases were pending at the beginning of the year; 84 fresh notices for enclosing the abandoned places to prevent nuisance were served during the year. Of these, 54 were complied with either voluntarily or after prosecution, 29 cancelled, 10 remained at the close of the year.

Unwholesome Lands (Section 306).

290 notices under this section for the removal of filth, prickly pear, or other noxious vegetation were served during the year, in addition to 44 left over in the previous year. The terms of 276 of these were complied with voluntarily, 23 after prosecution, 22 cancelled or withdrawn, the number pending being 13.

Lime-Washing and Cleansing of Buildings.

As the result of action taken under this section, 796 houses were white-washed and cleansed during the year, as against 1046 last year.

Insanitary Buildings (Section 308) and Buildings unfit for Human Habitation (Section 309).

1114 notices were pending on the 1st January 1916. 3586 houses were inspected in the course of the year with a view to remedy sanitary defects. 3328 houses were improved either voluntarily or through prosecution, while one notice was transferred to the Works Department for the work to be done at owner's cost. 383 were cancelled or withdrawn, leaving a balance of 988. 547 cases were pending last year under section 309 and 199 houses were condemned during the year. Of these, 232 were complied with either voluntarily or by prosecution, 224 cancelled or withdrawn leaving a balance of 90.

Fishing (Section 311.)

58 prosecutions for fishing and for washing animals in the Cooum, were instituted during the year.

Destruction of Stray Swine: and working of Lethal Chambers. (Section 313.)

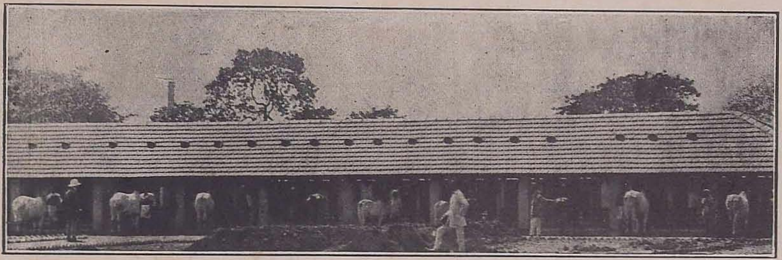
30 swine owners were prosecuted for keeping swine within the Municipal limits without permission. 15 stray swine were destroyed under section 313. 3,995 dogs, 4227 bitches and 211 pups were destroyed during the year, by means of hydro-carbon. During the year, expenditure on feeding the dogs was Rs. 585-12-8 while the total amount realised by sale of skins and rewards for dogs claimed was Rs. 590-6-0. The Chrome Leather Co., having refused to take the skins in the latter part of the year, and all attempts to secure another contractor having failed, the dogs were not skinned and the services of the two skinners were dispensed with from the 11th November 1916.

Cattle yards, Cow-Sheds, &c., (Sections 314, 315)

There are 649 cattle-yards (Cow-houses) in the City. 11 were refused licenses, 519 were given conditional licenses and 107 unconditional licenses. 12 were pending disposal at the end of the year. The stringent measures taken to prevent stabling milch cattle in dwelling houses continue to be enforced.

The model cattle-yard at Basin Bridge Road having been completed, attempts are being made to persuade cow-owners to use these buildings as cattle-yards for their own milch cattle. But there are difficulties in the way. Cattle-owners find it hard to keep their cattle far away from their houses. To avoid this inconvenience, only such cow-owners as live within a radius of two furlongs are being asked to use the new buildings, and only about 20 persons have acceeded to the request till now.

The condition of some of the existing cattle-yards of the7th and 8th Divisions is so bad that it has become necessary to bring pressure upon the cattle-owners to send their cattle to the model cow-houses. The alternative of improving the insanitary yards in accordance with the bye-laws is permitted in some instances. But the close vicinity of living rooms to cattle-yards, however well constructed, cannot be considered satisfactory from a sanitary stand-point.



Model yard for Milch-cattle. (Basin Road).

Stables.

Several of these are still unsatisfactory. The course of action adopted about the end of last year was continued. A circular containing directions with regard to sanitary improvements of stables is sent to the owner or occupier, and after an interval of three months the usual departmental steps are taken. Out of 181 hack stables, 60 were licensed unconditionally; in the case of 103 stables, conditional licenses were granted, and licenses were refused in the case of the remaining 18 stables. Out of the 103 conditionally licensed stables, the owners of 83 stables were prosecuted for failing to comply with the terms of the licenses.

For improving the sanitary condition of private stables, 159 fresh notices were served during the year under review; 95 notices were pending undisposed at the close of the year 1915. Of these, 43 were complied with voluntarily, 1 after prosecution and 78 were either cancelled or withdrawn, leaving a balance of 132. The above figures are gratifying in showing that the public have realised to some extent the great need to improve their stables and to put their horses in more decent places. It cannot be denied that there are still many stables requiring attention, and it is hoped that the citizens of Madras will co-operate with the Corporation in this direction. In cases where notices under section 315 have failed, notices under section 316 were served.

Cart-stands.

If existing stables are bad, the cart-stands are worse. Every cart-stand is intended to serve as a place of temporary shelter for the bullocks and men coming from up-country into the City for trade purposes. They halt for a day or so and then return to their homes. The cart-stands have as a rule no decent stalls for picketting bullocks, nor sheds for the men to eat and sleep. Each cartman cooks near or under his cart with the bulls at his side and perhaps sleeps under the cart or in it. The dung and dirt collected is removed by some relative of the owner or by some contractor who manufactures bratties in one or other corner of the cart-stand. There will probably be no satisfactory drainage arrangements.

The state of insanitation may not directly affect either the owner or the temporary sojourner. The former gets his fee allright, while the latter probably thinks that he must put up with some discomfort when he is away from home, and be thankful for the little mercies shown by the owner of the cart-stand.

With a view to improve the existing state of affairs special conditions are now imposed before granting licenses for cart-stands. But, of course, the progress can only be slow; and we cannot expect radical changes to take place in a day. We have to be content for the present with any small improvement that the owner may effect; if we insist on a large outlay on improvements at one time and refuse the license pending compliance, the owner may think that the job is not remunerative, and close up his cart-stand, with the result that carts and bullocks may be stationed anywhere in a blind alley, at a road-side-corner, which means that the remedy for the nuisance is worse than the very nuisance it was intended to cure.

In the case of new licenses, however, they are not granted unless the following conditions are complied with :—

1. The site selected must be at a safe distance from human habitations.
2. There should be properly paved bays for stabling bullocks.
3. There should be suitable sheds for sheltering men.
4. Good water-supply must be ensured.
5. Sufficient latrine arrangement should be provided and
6. The whole place must be properly drained and connected with the public drains or sewers.

Public Bathing and Washing places.

There are seven bathing places provided in the following parts of the City, and they are serving very well for the class of people for whom they are intended :—

1. Basin Bridge Road, 3rd Division.
2. Thambu Chetty Street, 5th Division.
3. Govindappa Naick Street, 7th Division.
4. Elephant Gate Road, 8th Division.
5. Badriah Garden Street, 9th Division.
6. Veeraraghava Mudali Street, 17th Division.
7. Ice House Road, 18th Division.

More are greatly needed in this City. There are several slums and paracherries where one or two public taps on the road-side serve the whole area. These merely enable each house-holder to procure a pot of water in time in the midst of a large number waiting to have a turn at the tap.

It would be a wholesome rule to construct if possible a public bathing place at every place where a flush-out latrine is constructed, perhaps at a short distance from the latter, the sullage from the bathing ghat being used to flush the latrine.

Dangerous or offensive trades : (Sections 322 and 324).

717 applications for licenses were received. 23 were refused, 327 unconditional licenses, 356 conditional ones were issued, leaving a balance of 11, pending disposal at the end of the calendar year.

Dying pots in Inhabited Localities.

64 applications were received, of which, 26 were given conditional licenses, 35 unconditional licenses, 2 were refused, and 1 was pending at the end of the year.

Paddy Boiling Houses.

634 applications were received for the licensing of paddy boiling houses. Of these, 495 were granted unconditional, and 84 conditional licenses, and the remaining 55 are pending disposal.

The danger of these two trades from a malarial stand-point does not yet seem to have been quite realised. In the Quarterly Reports on Anti-malarial works, it has frequently been pointed out that dangerous An. Mosquitoes are found breeding in pots intended to be used for soaking dyes or paddy as the case may be, but not actually used as such. After a shower, water collects in these pots, and mosquitoes breed abundantly. The largest number of these pots are found in that part of Tondiarpet (2nd Division) called the Tinnevelly Settlement which is one of the most insanitary and unhealthy parts of Madras. Two years ago all the dyers were notified to remove their dyeing work to some place distant from human dwellings. But where were they to go ? There was the rub ; representations were made that it was impossible for them to remove at a short notice, and with no prospects of better places. The dyer or paddy boiler cannot have his workshop at one place and live in another. The nature of the work is such that much of it has to be done in the open, and the owner has therefore to maintain a watch ; otherwise, his dyes or paddy may be stolen. It was found difficult to enforce the notices already served and all of them were cancelled. But things could not be allowed to stand where they were, and something had to be done to overcome the existing evil. All unused pots were filled up, and it was decided not to grant further permission for putting in fresh pots in the vicinity or for re-opening the old unused ones. In the interests of the public, it is highly desirable to set apart for the use of dyers and

paddy boilers some suitable and fairly extensive plot of land away from human habitations. Such ideal places are available in plently in the extensive waste garden land in Korukupet. If dyers and paddy boilers carry on their calling here without creating nuisance, nothing better could be expected; if they do not, they will be a danger to themselves, but their unoffending neighbours will be saved from a like danger.

Brick and Lime-kilns. (Section 322).

76 applications were received, 2 refused, 74 unconditional licenses issued. It may be noted in passing, that the Government in the Public Works Department have not yet removed their brick-field and kilns outside the Municipal limits.

Oil-Mills.

106 applications were received during the year for the licensing of oil mills 15 were granted unconditional licenses and 71 conditional licenses 19 were refused and 1 remains pending.

Aerated Water Factories (Section 328).

21 applications were received. 9 were granted unconditional licenses; while 11 were granted conditional licenses which demanded sanitary improvements within a prescribed period. 1 remained pending. Frequent and vigilant inspections by the Sanitary Inspectors and Food Inspectors were made during the year. Still the old conditions prevail in some shape or other.

This is another trade, the proper control of which is beset with great difficulties. In many cases the proprietor is not disposed to worry himself so long as his plant works somehow and he is able to aerate so many hundred bottles of water every day. He does not bestow a second thought on the quality of the water he is using. He used tap water freely until the Municipality put in a meter to measure the quantity of water used by him every month, with the result that he finds it more economical to supplement tap supply with that obtained from an ordinary well.

Filter beds that were fixed up when the factory was erected several years ago are perhaps all choked up; the candles of the Berkfield filter are either clogged and not in use, or broken and not replaced. The result is that the proprietor uses water directly from the tap or the well. Empty bottles are cleaned and recleaned in the same foul water. Little wonder then that complaints reach us fairly frequently regarding the filthy and unwholesome nature of the water used for aerating purposes. But, how can a person thrive by the sale of "quarter anna aerated waters" unless he exercises strict economy in every direction, and how little power has the Corporation to regulate this trade. The Law courts have held that aerated water is not an article of food. Suspended impurities are frequently discovered in these waters, and the almost invarible excuse in most cases is that these came from the tap water used as required by us. In my personal inspection of some of these factories I found in one case the larvae of Culex mosquitoes in a sample obtained from a Berkfield filter "supposed to be in good working order", although three candles were cracked and broken. One bottle contained a large Centepede, another a considerable quantity of suspended impurities. Both the manufacturers as indicated by the labels on the bottles were prosecuted, but were acquitted.

Bakeries and Sweet Meat Bazaars:

These again are items that require thorough overhauling. I have known an instance where a loaf of bread was found to contain a dead Lizard. Any one can see the way in which the sweet-meats are exposed for sale, covered with dust and arranged on planks abutting right into the street and immediately over a public drain. The licensing conditions have been made more stringent and licenses are now issued only sparingly. Proprietors of bakeries and sweet-meat bazaars were required, to

produce certificates for their workmen to the effect that they are free from contagious and loathsome diseases, such as Syphilis, Tubercle, Leprosy, etc., and the proprietors of sweetmeat bazars were required to put in the sweets in fly-proof glass cases and not to encroach on street drains. But these measures cannot prove effective unless the consumer realises the danger lurking and refuses to patronise a bakery or sweet-meat bazaar that is not sanitarily kept, and unless the producer begins to realise that, to sell unwholesome articles of food, is an evil action the moral responsibility for which he can never escape whether his act amounts legally to a crime or not.

Bake-Houses (Section 328.)

52 applications were received during the year for the licensing of bake-houses, 12 were granted licenses unconditionally while 38 were granted licenses subject to the fulfillment of sanitary improvements. 2 were refused. During the year under review, the workmen in bakeries were required to have their medical certificates renewed as indicated in the previous report.

Sweet-Meat Bazaars: (section 328).

186 applications for sanitary certificates were received. 42 unconditional, 135 conditional licenses were granted after the defects pointed out by the Sanitary Staff were carried out by the proprietors, 6 were refused, leaving 3 pending. The coffee clubs have considerably improved since last year but the Muhammadan tea clubs are still in a shocking condition. It is hoped that they will be tackled in the course of the current year.

Washing: (Section 329).

The system of work mentioned in last year's report is working satisfactorily. The income for the year from the Dhobikhana is Rs. 1,087-8-0. The contemplated construction of a Dhobikhana in Robinson Park for the dobies of the north range is still in abeyance. Bye-laws for the Dhobikhana referred to in the last year's report were approved by Government and are being published for the information of the public.

Washing and Storing Soiled Clothes.

349 applications for licenses from dhobies under section 322 of the Act were received during the year ; 5 were rejected, 165 licenses were issued unconditionally, 169 conditionally, leaving a balance of 10.

Slaughter-houses (Sections 331 to 335).

The number of sheep and goats slaughtered during the year was 40,9278, the number of cattle, 15,860, and the number of pigs, 1520. The motor meat vans for carying meat &c. from the slaughterhouses to the different parts of the city continued to work during the year. The collection from the meat vans was Rs. 4,927-12-6 and expenditure on this account, Rs. 6,009-14-2. The excess of expenditure over income is chiefly due to the thorough overhauling of one of the vans during the year. The right of collecting rents and fees for the use of the slaughterhouses under section 331 and of levying fees as required by section 334, is leased out annually and the total receipts under all heads, including that for delivery of carcases, amounted to Rs. 79,308-7-0 for the *official* year.

During the year, permission was granted for the slaughtering of sheep, goats and pigs in private houses on occasions of religious ceremonies and festivals, and the number so slaughtered were 1,518 sheep or goats, 8 pigs, and 5 cows. Every attempt is made to ensure that these applications are strictly bona-fide.

A great number of bullocks, cows, sheep and goats were brought in for slaughter. The number slaughtered in 1915 was 3,80,465 while the number in 1916 was 4,25,138. 5 pairs of bullocks were maintained to convey Offal matter and to remove manure to the trenching grounds. The right of lighting and maintaining 8 power lamps in the Slaughter-

houses was let on contract with effect from 1st April 1916 to Messrs. S. R. Sabhapathy & Co., Mount Road, at the rate of Rs. 10/- *per* lamp *per* mensem. The lamps worked satisfactorily.

Flour Mills.

9 mills were opened during the year. Most of them are driven by electric power and are installed in crowded localities. There is a tendency to multiply these mills indefinitely to the prejudice of the health of the neighbourhood, and care is taken not to issue licenses for the mills among dwelling houses.

Markets, Public and Private :

The Corporation maintains as before two markets, the Moore and the Smithfield Markets. The right of collecting fees from the latter was leased for the year 1916-17 for Rs. 3,990, while the collection of rents from the former is, as usual, entrusted to the Revenue Department. Both markets are under the administrative control of the Health Department and their sanitary condition was on the whole satisfactory. Improvements to the Smithfield market were effected during the year at a cost of Rs. 720. There are 44 private markets within the City licensed by the License Branch, subject to the control of the Health Department with reference to their sanitary conditions. The number of licenses issued is as follows : 34 conditional and 10 unconditional. 8 owners of markets were prosecuted and convicted for not abiding by the conditions laid down in the licenses granted, and others have been warned several times. But there are some difficulties in the way of enforcing the law in all its strictness ; most of these markets, especially the combined ones are overcrowded, and vegetables, fish, meat, etc., are spread anywhere and everywhere. The worst of these are the Zam Bazaar and Pulibone markets in Triplicane, Kothwal Bazaar in Audiappa Naick Street, and DeMellows Market in Perambur. I am glad that the first, third and fourth are being enlarged by the construction of extra stalls and platforms on neighbouring lands purchased by the owners. Because of the great usefulness and the real need of the markets it would cause great hardship to the people, if the rules were enforced with indiscriminating strictness. An urgent need is the provision of more markets—especially vegetable markets—in several parts of the City where for lack of such provision, vegetables are now being sold at the road side drains. Chief among such numerous places are (1) Junction of Rasappa Chetty Street with Mint Street, (2) Anna Pillai Street, near Govindappa Naick Street, (3) Mannarswami Koil Street, Royapuram. In spite of the well known fact that markets are good paying concerns, it is passing strange that more markets do not spring up in larger numbers throughout the City.

The Kothawal market is the largest vegetable market, and serves as a large go-down for the supply of vegetables to far off parts of Madras. The Trustees have generally carried out improvements suggested to them from time to time, although they are much hampered in their work by lack of adequate accommodation for expansion.

Sale of eatables in streets :

174 prosecutions against defaulters were instituted under section 351.

Food and Drugs:

The question of a Chemical Laboratory and a Chemical Analyst referred to in previous reports is still pending for want of funds.

As usual, the Madras Port Trust, the Railway Goods Shed at Royapuram and at Salt Kotaurs were vigilantly watched during the year. The statement in Appendix will show the work done by the Food Inspectors and Sanitary Inspectors in their respective divisions.

3. CONSERVANCY.

The Conservancy of the City continued to be under the direct control of the Senior Assistant Health Officer. The immediate supervision of the Conservancy of each of the 20 divisions was under an Overseer aided by 3 to 7 peons according to the requirements and extent of the division. There are 20 Conservancy Overseers and 103 Conservancy peons.

Conservancy Overseers. Conservancy Overseers are, with a few exceptions, certified Sanitary Inspectors. During the year under review they have evinced an increasing interest in the discharge of their duties and have zealously carried out the works prescribed to them.

Conservancy Peons. There are 103 conservancy peons. Each peon is in charge of a section of a division and is held responsible for its cleanliness. During the year these peons have shown a good deal of improvement in the management of coolies and carts placed under their control. Their pay has recently been enhanced, which is perhaps an incentive to better work.

Cleansing Staff. There are 1,104 men, 101 women and 102 boys engaged in cleansing the city. The details of the staff of coolies are given below :—

Sweeper maistries	20
Street sweepers	337
Side cooly maistries	21
Side drain coolies	264
Side drain boys	23
Cess-pool boys	37
Silt trap coolies	28
Main drain coolies	30
Latrine men	88
Latrine women	101
Box-cart men	123
Sewage barrel-cart men	73
Sewage hand-cartmen	35
Reserve sweepers	25
Dung boys	42
Dung peons	6
Night conservancy sweepers	26
Hand-cart men	28

Bullock and cart-depot staff. There are 8 conservancy cart-depots each in charge of a Superintendent. These Superintendents continued to be under the direct control of the Chief Superintendent, who is responsible to the Health Officer for the proper conduct of the depots. The details of carts and coolies are as follows :—

1. For the removal of rubbish—

Rubbish carts	233
Trollies	61

2. For the removal of filth—

Cylindrical night-soil carts	72
Iron night-soil carts	184
Lorries	16
Night-soil hand carts	28

3. For the removal of silt, side scrapings and sewage—

Box-carts	151
Sewage barrel-carts	24
Sewage hand-carts	35

Details of Depot Staff—

Rubbish cart drivers	233
Trolly drivers	61
Night-soil cart drivers	256
Box-cart drivers	151
Reserve drivers	40

Conservancy Labour.

Shortage of conservancy labour was not so keenly felt as in the previous year. During the year under report the coolies were brought under more disciplinary control. They have become habitual to a mechanical performance of the work demanded of them, and have shown on the whole a good deal of contentment. Strikes were conspicuous by their absence during the year.

Cooly lines.

There are drivers' quarters attached to the two cart-depots of the North Range besides the new model lines of 34 tenements, adjoining Cemetery Road, intended for sweepers. These dwellings are let out at a nominal rent. The tenant coolies have invariably been regular in their daily attendance, and have conducted themselves well in the discharge of public work. No new lines were constructed during the year for want of funds, although the need for more of such, model dwellings for our labourers is being keenly felt.

Supervision over carts and drivers.

Closer and more careful supervision has been exercised on drivers and working of carts. Examination of the statistics of the daily attendance of carts, bullocks and drivers, coupled with the scrutiny of the issue and production of load chits were very useful in checking daily movements of carts and of work done. Superintendents of cart-depots are now granted a cycle allowance of Rs. 5 *per mensem* to enable them to go about the various dumping places and divisions, with a view to check ill-treatment of bullocks, loitering of carts, in and out of way places, and other vagaries.

As was stated in my report last year, 30 double bullock conservancy carts were converted at my instance into single draught ones. These having worked with success, the change has been extended further to economise expenditure and lessen the demand for bullocks. There are at the moment of writing, 100 single bullock rubbish carts and 58 single draught night-soil carts working. There therefore is, or should be, a saving of 158 bullocks or Rs. 158×90 or Rs. 14,220,—the average cost of a bullock being Rs. 90. Further there should be a saving of the cost of fodder for these bullocks. The cost of fodder for a

bullock is Rs. 10 and there, therefore, should be a saving of Rs. 158 × Rs. 10 *per* month or Rs. 18,960 for a year.

If the rest of the carts (331) can be converted into single draught ones there should be a saving of Rs. 69,510. The daily average of conservancy carts sent out for work was 624, although the budget complement was 659. The daily shortage of 35 carts was generally due to want of bullocks or drivers.

The total budget complement of bullocks for the year was 1,476, but the actual number maintained on 1st January 1916, was 1,358. During the year there were 195 casualties, and 82 bullocks were sold as unserviceable, leaving a shortage of 277 bullocks, 234 bullocks were purchased to replace the shortage. The number of bullocks on hand on 31st December 1916 was 1,312, a decrease of 164, which was rendered possible by the change from double to single draught.

To reduce the number of bullocks purchased every year it has been suggested that the working range of each rubbish cart should be extended by addition of two or more streets in each section, and by getting the sweeper and the driver to make three trips instead of two to the Motor transport station. In the practical working of such a scheme there are several difficulties.

Both the driver and the sweeper have private scavenging, and want a portion of their time for doing this work. In the interest of sanitation this cannot be interfered with, until and unless there are enough private scavengers to cope with house conservancy.

With the increase of work the strain becomes greater on the driver than on the sweeper; the sweeper merely sweeps, the driver picks up and loads the cart. The driver unlike the sweeper has to go back to the depot, wash, groom and feed his bullocks. Drivers if thus overworked will frequently be absent from work and in the absence of the driver or the sweeper work is not done satisfactorily.

In-as-much as a much larger area will be served by one cart, the stoppage of a cart will become a serious matter than it is now, and if motor lorries go out of order, with fewer carts conservancy will be handicapped.

There are already complaints from the Chief Superintendent that carts do not return to depots sufficiently early for the bullocks to have sufficient rest before they are sent out for work again. If a larger area is prescribed such complaints will be more frequent.

If conservancy carts work to a late hour it will be against the accepted sanitary principle of cleansing streets and refuse-bins in the earlier hours of each day when there are few people about. Already there are frequent complaints that certain areas are conserved later than 8·30 even 9 A.M. by carts making a second trip; and if carts are made to do three trips complaints will be more bitter and may need re-consideration.

In the Budget estimate for 1916-17, provision of Rs. 1,93,840 was made for maintenance of bullocks. The actual cost for the first six months was Rs. 70,490 and consequently a reduction was made in the Revised estimate to Rs. 1,55,500 or Rs. 38,340 less than the Budget estimate. Even this amount was not actually spent, the actual expenditure being Rs. 1,48,651-0-5. There being therefore a total saving of Rs. 6,848-15-7

Types of single-bullock carts.

under this head. Rs. 15,170 was transferred from this and other savings from the budget grants to improvements of conservancy cattle depots as detailed below :

For improvement of	C Depot ...	...	...	Rs.	4,000
Do	H Depot ...	...	...	„	3,700
Do	G Depot ...	...	...	„	2,170
Do	A Depot ...	...	...	„	5,300

Maintenance of Labour.

The amount spent on labour employed for conserving streets and public latrines was Rs. 53,770-9-6 against Rs. 1,21,651-7-7 for the previous year which included the wages of drivers which were debited to Maintenance of bullocks.

Health of Bullocks.

The health and condition of the cattle were extremely good during the year. In the months of January, November and December, foot and mouth disease prevailed in all depots except Choolai depot. There were 152 cases in all but none proved fatal. Antiseptic foot-baths and other precautionary methods adopted, prevented and arrested the spread of the disease. During the year there were a few cases of Anthrax and one case of Rinder-pest. Happily these diseases did not spread in the depots although cattle in various parts of the City were attacked from time to time. There were 14 cases of Surra in Basin Road Depot. The old bamboo mangers are to be removed and iron mangers substituted as bamboo mangers are a harbour for all kinds of infectious germs. Hydrophobia made its appearance in Harris Road and Barber's Bridge Depots. On 5th August 1916, bullock No. G. 89 showed symptoms characteristic of rabies. The animal was isolated, and made secure to prevent its damaging other bullocks. This case proved fatal. Bullock No. E. 110 exhibited symptoms of rabies on 9th September 1916. This animal was destroyed and its head sent to the Veterinary Hospital. Microscopical examination revealed the presence of rabies organisms. All stray dogs were prevented from entering cattle depots ; ownerless dogs were caught and destroyed.

As there were only 31 deaths during the year from infectious diseases, the fact of careful supervision being exercised becomes apparent. Cattle employed on conservancy work are bound to be affected if contagious diseases prevail in the City, as they work amid filth and dirt. The Depot Superintendents and the Chief Superintendent are to be commended for the care they took of the bullocks placed in their charge.

Conservancy Carts.

During the calendar year 44 single draught rubbish carts and 23 single draught night-soil carts were manufactured and were in use. Basin Road and Harris Road Depots have now all single draught carts. These carts are handy for carting rubbish and filth more particularly in narrow streets and lanes, and have proved a success. All rubbish carts and night-soil carts under construction are being made up for single draught.

Improvement of Cattle Depots.

During the year the cattle sheds were extended in Harris Road and Krishnampet depots to relieve congestion. In the Burial ground Depot iron mangers and curb stones were erected. The old damaged platform of the water trough was removed in Barber's Bridge Depot, and a new one laid with effective drainage. Various minor works such as retiling of cattle sheds and the provision of steel pole fencing, etc., were also executed. Reclamation work was carried out in various depots to bring them above the level of the surrounding fields

and thereby prevent flooding during rains. A large number of trees was planted to provide shade for the out-side standing of cattle. In fact great improvements were effected in the maintenance and working of depots and credit is due to Mr. Shannon therefor.

Removal of rubbish

The number of cart-loads of rubbish removed during the year was 292,527 against 283,565 in the previous year. All sorts of rubbish were collected and removed. Two large motors continued to work in Georgetown. Two small Ford vans were purchased during the year. These work in the 13th and 16th Divisions.

Motor Lorries and Municipal Conservancy.

The use of petrol motors for municipal work is gradually developing in the City of Madras. The Corporation have, for conservancy purposes, two big Thornycroft vehicles and two small Ford vans. The bigger ones are 3½ ton vehicles and could hold 10 of the average cart-loads of rubbish giving a load of three tons. The smaller vans are one ton vehicles, and could hold nearly two cartloads of rubbish giving a load of nearly one ton.

Motor vehicles are not so economical for purposes of picking up street refuse as bullock carts are. But, on the other hand, when rubbish has been collected by ordinary rubbish carts in the several sub-depots, the lorries are of immense service in speedily removing it to its destination for disposal. There are four such sub-depots in convenient centres of the city—Wall Tax Road, Broadway, Napier Park and Goyathope—within 10 to 15 minutes' reach of bullock carts working in the localities specified. The distance from each of these sub-depots to the final discharging places varies from 1½ to 3½ miles. The motor lorries do the distance from the sub-depots to the dumping ground or to the refuse destructors, discharge their loads there and return for fresh loads in about 25 minutes. They are worked from 7 A.M., to noon and again from 2 to 5 P.M., daily and make 8 trips each *per* day. In the afternoon the lorries are chiefly employed for removal of silt, earth, etc., Much time hitherto spent by the bullock carts in going to, and returning from, incinerators and dumping grounds has been saved by unloading these carts at sub-depots from where the lorries run off loads in 25 minutes as against some hours of tardy journeying by several carts. The introduction of motor lorries has thus enabled the bullock carts to do twice as much collecting work in the streets.

When these lorries were introduced, the Corporation had not an adequate number of carts to cope with the work of collecting the city refuse. By the use of the motor lorries there has been therefore no perceptible reduction in carts. Nevertheless, it should be granted that a big lorry takes the place of 30 additional rubbish carts which would be required if the lorry ceased to work and if conservancy were maintained at its present standard. Twelve scavengers are employed for loading and unloading each big lorry in the place of the 60 men required for working 30 rubbish carts.

Motor lorries have also been a help in emergencies on occasions of heavy rubbish such as *Dasra*, *Deepavali* and *Pongul*, and immediately after cyclonic weather, the lorries made as many as 12 trips each a day. But for them the City would never have been kept clean and free from refuse. The relief thus afforded is worthy of notice.

The radius of each sub-depot has been so fixed that the bullock carts working within the area can readily make the required number of trips. This has materially helped the Conservancy Overseers to keep the cart and drivers under supervision. It has become possible to check the loads which previously went unchecked. For, when bullock

carts had to cover a distance of six miles to and from the places of final disposal, street scavengers and drain cleaners left behind were tempted to decamp or to idle. In the absence of these coolies the driver picked up as little rubbish as possible and hastened away to complete a "second trip."

Motor lorries make for economy in money as compared with bullock carts. One Thornycroft lorry is also profitably employed for removing night-soil from His Majesty's Penitentiary. This yields an income of Rs. 158 *per* month.

Initial cost and monthly maintenance cost of a Motor Lorry are somewhat as follows :

	Rs.	A.	P.
Initial cost (Petrol Heavy Motor Lorry)	12,850	0	0
Maintenance cost :—			
Petrol 210 gals.	210	0	0
Cylinder oil 20 gals.	36	4	0
Kerosine oil 4 gals.	1	14	0
Cocoanut oil 1 gal.	1	8	0
Grease 20 lbs.	5	0	0
Waste	3	8	0
Brasso	1	0	0
Soap	1	0	0
Average cost of repairs	80	0	0
Inspection charges	10	0	0
Staff	247	0	0
Total expenditure *per* month ...	597	2	0

Initial cost of 30 Rubbish Carts and 60 bullocks ; and cost of maintenance per month.

	Rs.	A.	P.
Cost of 30 double rubbish carts at Rs. 250 each ...	7,500	0	0
Sixty bullocks at Rs. 90 eaeh	5,400	0	0
	12,900	0	0
Maintenance at Rs. 35	1,050	0	0
Sweepers at Rs. 8	240	0	0
Sundries	20	0	0
Total ...	1,310	0	0

Initial cost and maintenance charges of Motor Lorries as compared with Rubbish Carts.

	Initial cost.	*Maintenance per month.*
Motor lorry	Rs. 12,850	597 0 0
Rubbish carts if employed to cope with the work ...	„ 12,900	1,310 0 0

Disposal of Rubbish. The great bulk of the collected refuse was used for reclamation purposes by the Malaria Department. The rest of the rubbish was incinerated in the various Incinerators of the City.

Seven small Incinerators were constructed during the year making a total of 26 at work. The total quantity of mixed rubbish received and burnt at the large and small Incinerators, amounted to 195,981 cart-loads. With the ash and screened earth from the Incinerators, 748,900 c. ft. of land were reclaimed. 6,302 cart-loads of earth and ash from the Krishnampet and other Incinerators were sold. Free permits are now granted to private parties for removal of earth and ash from the big Incinerators.

Removal of filth.

185,323 cartloads of filth were removed during the year as against 181,381 cartloads in the previous year. Night-soil continued to be removed from the penitentiary in motor lorries. The old system of night conservancy in the 13th and 15th Divisions with bullock carts was renewed in November 1916, and a Ford night-soil lorry was converted into a rubbish van.

Disposal of filth.

The night-soil flush-out depot in Ice House Road has worked satisfactorily and the filth from the 17th to 20th Divisions both inclusive has been disposed off in an up-to date sanitary measure. Nightsoil from 1 to 9 Divisions is trenched in Korukupet Depot. In-as-much as this depot is well away from the City limits nuisance is at a minimum. The eradication of the horrible nuisance from the Brick Kiln Road trenching depot is nearing as the new flush-out depot at Langs Garden pumping station will be at work shortly..

The amount realised by the sale of manure from the trenching grounds during 1916-17 is Rs. 17,848-1-0 against Rs. 19,384-13-0 in the previous year.

Removal and disposal of silt, side scraping and sewage.

1,88,911 cart-loads of silt, side scraping and sewage were removed during the year against 1,77,529 in the previous year. Silt, side scraping etc., so removed were used for covering rubbish or for reclamation of tanks, etc.

Disinfection.

Many gallons of disinfectants were used during the year to put down flies and to maintain the sanitary condition of conserved streets and drains. The quantities and kinds of disinfectants used are detailed below:

Sanitas Okal	...	...	...	554 gals.
Hydro-carbon	...	...	...	2,002 gals.
Carbolic powder	...	...	...	76 casks.
Chunam	...	...	...	6,657 paras.
Cyllin	...	...	...	20 gals.

Scavenging of Public Institutions.

The amount realised by the supply of conservancy carts and coolies to private bodies under section 294-b and 295 of the Act was Rs. 8,038-12-4 against Rs. 8,533-15-6 in the previous year and the expenditure on labour under this head was Rs. 2,211-3-7 against Rs. 2,370-9-9 for 1915-16.

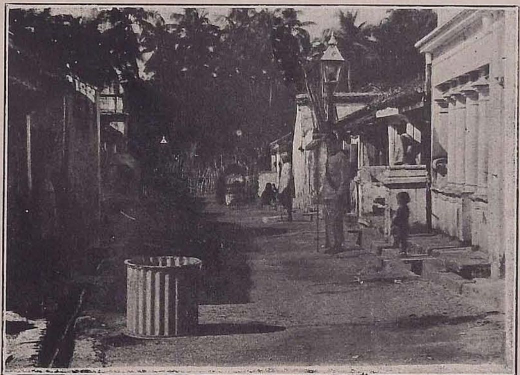
Cleansing of Public thoroughfares.

42 boys were employed for cleansing and keeping clean the public thoroughfares from horse dung, cow dung, etc. These boys have done well.

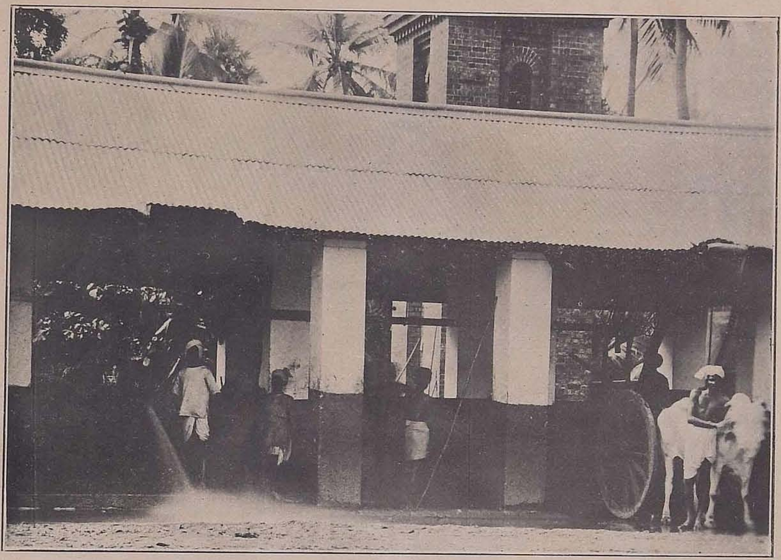
Public latrines.

During the year, nine old dry latrines were converted into flush-out ones and full time toties were appointed to keep them in clean and proper order. Sand was renewed in many of the sanded latrines.

Street before Conservancy.



Street after Conservancy.



Pail-depot for flushing night-soil into sewers.

Save in a few cases the Corporation undertakes no private scavenging in the City. Under section 227 all private latrines and privies are under the control of the Corporation and should be repaired and kept in proper order at the expense and charge of the owner of the building or land to which they belong. If this provision is to be a reality, private scavenging should be undertaken by the Corporation both for their pecuniary advantage and for the sanitary convenience of the rate-payer as suggested in my report last year. Failing this, the only remedy lies in framing and enforcing a law for licensing of private scavengers so that they may be brought under desirable control. This will go a great way in checking the vagaries of private toties.

Private scavenging.

The total number of prosecutions for indiscriminate throwing of rubbish in the streets and washing of night-soil into public drains was 382. The prosecutions have had some effect in preventing such nuisance.

Prosecutions.

(Sd). C. SINGARAVELU, L.R.C.P. & S.,
1*st Assistant Health Officer.*

4. VACCINATION.

The City is divided into ten vaccination districts, each under a qualified Sub-Assistant Surgeon called the "Medical Vaccinator." Since the reorganisation of 1913, there has been only one woman-vaccinator for the whole City; and an additional woman-vaccinator was permanently entertained during the year 1916. Each Medical Vaccinator has an assistant to trace out unprotected children in his district, and to issue notifications.

The vaccine for the operation is obtained from the King Institute, Guindy.

Total cases for the year.

The total number of vaccinations performed in the City during the year 1916 was 65,832 (44,108 males and 21,724 females) against 29,990 of the previous year. Of these, 19,712 were primary vaccinations and 46,120 were revaccinations.

Of the total number of operations in the city, 62,546 were vaccinated by the Corporation Staff, 1,096 reported by the Medical Officer in charge of the Penitentiary, and 2,190 performed at the Fiji Emigration Depot. Of the 62,546 cases vaccinated by the Corporation staff, 19,598 were primary vaccinations and 42,948 revaccinations. Of the former, 17,029 were performed at the depots and 2,569 outside; and of these latter again, 112 were domiciliary vaccinations performed on payment of fees, the remaining being cases performed in infected localities and in poor quarters such as paracherries, hutting grounds, etc.

Percentage of success.

The Corporation Staff verified the results of vaccination in 18,680 primary cases, of which, 15,479 were brought to depots as required by the bye-law. Of the 18,680 primary vaccinations verified, 18,097 were successful and 583 unsuccessful, the percentage of success being 96·88 against 96·37 during 1915.

During the year 1916, the Assistant Health Officers verified the results of vaccination in 15,976 cases against 8,870 in the previous year.

The percentage of success among the cases verified in primary and secondary vaccinations and in re-vaccinations (including those performed in the Government Penetentiary and the Fiji Emigration Depot) was 96·87 and 65·52, respectively, against 96·31 and 56·80 in 1915.

Vaccination of children under one year of age.

The total number of primary vaccinations was 19,712, of which, 16,053 were among children under one year of age against 16,442 in the previous year. The slight decrease is attributable partly to the large number of cases certified to be medically unfit (431 against 308 in 1915) and partly to the fact that some panic-stricken people are in the habit of temporarily removing their children from the infected areas, whenever an epidemic of Small-pox breaks out there, as it did in Madras this year. The percentage of success among the cases verified (15,350) was 97·04 against 96·40 in the previous year. Of 16,053 children vaccinated under one year, 10,238 or 63·78 *per cent.* were born in Madras and 5,792 in the moffussil, the remaining, *Viz.*, 23 beingcases vaccinated at the Fiji Emigration Depot. The number of children thus vaccinated was 30·95 *per mille* of population compared with 31·70 in 1915, and the number successfully vaccinated was 28·72 *per mille* against 29·60 in 1915.

The total number of births verified during the year was 15,709 as against 14,874 in 1915. Of these, 3,726 children or 23·72 *per cent.* died during the year, 2,627 were reported to have permanently left the city, (for 1915 it was 2,631) and 450 were not traceable at the addresses given in the birth counterfoils in spite of special efforts being made for a closer observation of city births till they are vaccinated. Of the remaining 8,906, the number vaccinated was 8,260, *i.e.*, 52·58 *per cent.* of births verified. Vaccination was postponed in 431 cases against 308 in 1915; of these, 184 were certified unfit by Registered Medical Practitioners, and 247 by the Vaccination Staff, and 130 had temporarily left the city. In the remaining 85 cases which were pending at the end of the year, the parents were warned to have the children vaccinated without delay.

Verification of births.

From enquiries instituted to find out the vaccinal history of children born in the City, but reported to have been removed out of it before being vaccinated, it transpired that only 148 were reported to have been vaccinated in the moffussil. These conditions will doubtless show satisfactory improvement when vaccination is made compulsory in the moffussil as in the City.

Hospital births.

Hospital births numbering 4,033 were verified during the year. Of these, 642 or 15·92 *per cent.* were reported to have died; 624 or 15·47 *per cent.* were reported to have been permanently removed from the City, and 1,431 were not traceable at the address given in the birth counterfoils, leaving 1,316 available for vaccination. Of these, 1,217 children were vaccinated during the year. Vaccination was postponed on medical certificates in 24 cases, 22 children were found sick by the vaccination staff, and 31 had temporarily left the City. The remaining 22 cases were found healthy and the parents were warned. The large number of untraced cases among hospital births is due in many instances to the insufficient and incorrect addresses given in the birth counterfoils. Undoubtedly there are great difficulties in the way of obtaining accurate and reliable addresses of persons admitted to the hospitals; to give the correct name of the street and house or hut number (if indeed the huts of our slums are numbered at all) would be an intellectual exercise beyond the powers of many a dweller in our slums and paracherries; further, the condition in which a number of expectant mothers are brought to the hospitals is generally not such as will permit categorical answers to the queries of a scrupulous Registrar of admissions. Nevertheless some gradual improvement is not impossible and I appeal to all concerned to pay a little more attention to the question of obtaining accurate residential addresses of mothers delivered at the hospital. It is for lack of such information that we find it difficult to serve notifications requiring the vaccination of children as soon as they attain vaccinable age. (In Madras City, vaccination is compulsory when a child is six months old).

Statement 1 on page 65 furnishes information as to the number of births registered by the vaccination staff during the year 1916 and the number of children vaccinated before they attained the age of one year. New forms have been introduced for preparing the birth-counterfoils, and if all the information asked for in this form is correctly furnished, it is hoped that permanent removals will be properly noted, and that untraced cases will show an appreciable decrease.

Analysis of totals according to race.

Out of the total number vaccinated (65,832), 10,778 were Europeans, Anglo-Indians and Indian Christians, 49,929 Hindus, 5,083 Muhammadans, and 42 other castes. For every 1,000 of the population according to the Census of 1911, 126·93 were vaccinated. The

proportion of Europeans, Anglo-Indians and Indian Christians vaccinated was larger than that of any other class, the number vaccinated amongst them being 25·78 *per cent.* of their population ; whereas the percentages among Hindus, Muhammadans and other castes, were 12·00, 8·59 and 2·37, respectively. This increase among Europeans, and Anglo-Indians is due to the large number of re-vaccinations performed during the epidemic of Small-pox.

Prosecutions.

The total number of prosecutions instituted during the year was 80 against 243 in 1915. The fines imposed, amounted to Rs. 34-4-0 against Rs. 100-4-0 in the previous year. In 65 of these cases, prosecution was for failure to have children vaccinated, the result of which was that the children were all vaccinated subsequently. The remaining 15 cases were for not bringing children for verification of results.

VACCINATION PROSECUTION STATEMENT.

Number of Section of the Act.	Nature of charge.	Number of cases instituted.	Number discharged.	Otherwise.	Number convicted.	Total fine inflicted.		
1	2	3	4	5	6	7		
						Rs.	A.	P.
Under Section 409 of Act III of 1904.	(1) For not bringing children to be vaccinated after notice ...	65	34	19	11	26	8	0
	(2) For not bringing children for verification after vaccination ...	15	1	2	12	7	12	0
	Total ...	80	35	21	23	34	4	0

Fees.

The fees for primary vaccination at private residences under bye-law 233 amounted to Rs. 199-4-0. The amount was collected and credited to the Corporation.

Cost of vaccination.

The cost of vaccination was Rs. 15,132-11-9. If the amount realised by vaccination at private residences is deducted, the net expenditure amounts to Rs. 14,933-7-9. The net cost of each successful vaccination was annas five and pies nine against annas ten and pies six in 1915. The marked reduction in the cost for vaccination *per* head is accounted for by the extraordinary large number of revaccinations performed during the epidemic with very little addition to the vaccinating staff, as much of the extra work was done by the Plague Nurses and Malaria Nurses.

For vaccinal condition of Small-pox cases, see pages 27 to 29.

Vaccination Statement I showing the number of births registered during the calendar year 1916 and the number of vaccination of infants under one year of age.

Division.	Total births excluding still-births.	Still-births.	Deaths under one year.	Number of infants surviving.	Number of infants vaccinated under one year among Madras births.	Percentage of vaccination to births registered.	Remarks.
1	2	3	4	5	6	7	8
1	680 **206**	9 **11**	143 **17**	537 **189**	328 **111**	48·24 **53·88**	
2	1,299 **252**	42 **26**	276 **33**	1,023 **219**	653 **70**	50·26 **27·77**	
3	348 **86**	11 **10**	84 **10**	264 **76**	172 **17**	49·42 **19.76**	
4	433 **31**	16 **5**	98 **1**	335 **30**	158 **17**	36·48 **54·83**	
5	465 **120**	8 **12**	109 **8**	356 **112**	227 **18**	48·81 **15·00**	
6	622 **181**	11 **19**	128 **7**	494 **174**	228 **19**	36·65 **10·49**	
7	1,020 **228**	1 **16**	213 **47**	807 **181**	633 **99**	62·06 **43·42**	
8	668 **103**	1 **7**	138 **14**	530 **89**	360 **52**	53·89 **50·49**	
9	561 **75**	... **3**	153 **12**	408 **63**	278 **32**	49·55 **42·67**	
10	890 ...	29 ...	201 ...	689 ...	599 ...	67·30	
11	1,517 **317**	36 **7**	314 **43**	1,203 **274**	897 **142**	59·13 **44·79**	
12	737 **303**	52 **10**	124 **24**	613 **279**	398 **92**	54·00 **30 36**	
13	564 **499**	14 **53**	105 **40**	459 **459**	351 **131**	62·23 **26·25**	
14	334 **78**	20 ...	46 **9**	288 **69**	241 **26**	72·15 **33·33**	
15	326 **211**	26 **5**	43 **13**	283 **198**	190 **88**	58·28 **41·70**	
16	812 **293**	21 **12**	202 **25**	610 **268**	455 **77**	56·03 **26·27**	
17	1,263 **304**	36 **5**	308 **26**	955 **278**	592 **16**	46·87 **5·26**	
18	1,090 **132**	8 **9**	296 **33**	794 **99**	502 **30**	46·05 **22·72**	
19	972 **209**	20 **16**	235 **46**	737 **163**	568 **96**	58·43 **45·93**	
20	732 **167**	15 **12**	159 **32**	573 **135**	365 **84**	49·86 **50·29**	
Total.	15,333 **3,795**	376 **238**	3,375 **440**	11,958 **3,355**	8,195 **1,217**	53·45 **32·07**	

N. B.—The antique figures denote Hospital births.

Vaccination Statement II showing the number of births registered in 1916 and the number of infants vaccinated under one year of age.

Year.	Total number of births excluding still-births.	Number of children in column 2, who died before attaining the age of one year, without being vaccinated.	Number of children in column 2, who left the city before attaining the age of one year, without being vaccinated.	Number of children in column 2, who were available for vaccination (col. 2 *minus* 3 and 4).	Number of children in column 5, who were vaccinated before they attained the age of one year.	Percentage of column 6 to column 5.	Number of children in column 5, whose vaccination was postponed beyond one year of age for medical reasons.
1	2	3	4	5	6	7	8
1914	15,440	3,381	2,775	9,284	7,739	83·35	496
	1,607	**178**	**489**	**940**	**494**	**52 55**	**20**
1915	14,680	3,378	2,513	8,789	7,460	84·87	355
	3,269	**428**	**789**	**2,052**	**971**	**47.32**	**24**
1916	15,333	3,375	2,627	9,331	8,250	88·41	129
	3,795	**440**	**960**	**2,395**	**1,217**	**50·82**	**25**

N.B.—The antique figures denote Hospital births.

Vaccination Statement III showing particulars of Vaccination during the year ending 31st December 1916.

Old division.	Wards.	Corresponding present division.	Population.	Number of depots in each division.	Number of Vaccinators in each division.	Total number of persons vaccinated. Males.	Total number of persons vaccinated. Females.	Total number of persons vaccinated. Total.	Average number of persons vaccinated by each Vaccinator.	Primary Vaccination. Total. Males.	Primary Vaccination. Total. Females.	Primary Vaccination. Total. Total.	Primary Vaccination. Successful. Under one year.	Primary Vaccination. Successful. One year and under six.	Primary Vaccination. Successful. Six years and above.	Primary Vaccination. Successful. Total.	Primary Vaccination. Unknown.	Revaccination. Total.	Revaccination. Successful.	Revaccination. Unknown.	Percentage of successful cases in which the results were known. Primary.	Percentage of successful cases in which the results were known. Re-vaccination.	Persons successfully vaccinated per 1,000 of population.	Average annual number of persons successfully vaccinated during the previous five years. Number.	Average annual number of persons successfully vaccinated during the previous five years. Ratio *per* 1,000 of population.	Average annual number of deaths from small-pox during previous five years. Number.	Average annual number of deaths from small-pox during previous five years. Ratio *per* 1,000 of population.	Average cost of each successful vaccination.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	East Ward ...	1	20,318	1	1	1,089	679	1,768		318	371	719	517	147	2	666	28	1,049	527	253	96·38	66·21	58·72	840	41·34	18	0·9	Annas five and pies nine.
	Centre " ...	2	40,635	1	1	1,660	1,011	2,671		754	748	1,502	806	149	1	956	520	1,169	537	303	97·36	62·01	36 74	2,146	52·81	15	0·4	
	West " ...	3	15,120	1	...	718	264	982		193	181	374	238	66	9	313	53	608	222	230	97·51	58·73	35 38	847	56·02	2	0·1	
2	East Ward ...	4	14,564	1	...	2 384	685	3,069		291	263	554	423	82	2	507	25	2,515	993	790	95·84	57·57	102·99	822	56·44	4	0·3	
	Centre " ...	5	19,179	1	1	1865	1,163	3,028		345	294	639	381	196	8	585	38	2,389	868	452	97 31	44·81	75·75	713	37·18	12	0·6	
	West " ...	6	22,473	...	...	2017	1,171	3,188		426	465	891	731	102	6	839	29	2,297	875	626	97·33	52·36	76 27	914	40·67	6	0·3	
3	North Ward ...	7	37,065	1	1	1,462	1,366	2,828		811	829	1,640	1,269	278	40	1,587	26	1,188	499	141	98 33	47·66	56·28	1,489	40·17	12	0·3	
	Centre " ..	8	28,585	...	1	898	799	1,697		389	419	808	541	210	5	756	31	889	293	46	97·30	34·76	36 69	870	30·43	13	0·5	
	South " ...	9	20,937	1	...	913	622	1,535		333	376	709	522	150	2	674	17	826	280	183	97·40	43·55	45·56	639	30·52	7	0·3	
4	" " ...	10	24,979	1	1	2,671	909	3,580		560	564	1,124	918	125	11	1,054	14	2,456	1,161	708	94·95	66·42	88·67	1,859	74·42	1	0·04	
5	North Ward ...	11	41,523	1	...	2,725	1,681	4,406		890	884	1,774	1,463	154	23	1,640	34	2,632	1,458	409	94·25	65·63	74·61	2,104	50 67	7	0·2	
	Centre " ...	12	29,776	...	1	1,958	1,793	3,751		704	624	1,328	1,144	140	1	1,285	13	2,423	1,352	479	97·72	69·55	88·56	1,639	55·04	4	0·1	
	South " ...	13	23,717	...	1	2,973	1,096	4,069		493	490	983	843	126	...	969	1	3,086	2,158	349	96·68	78·85	131·84	1,140	38 06	8	0·3	
6	North Ward ...	14	11,751	1	...	1,651	1,266	2,917		337	296	633	:63	60	...	623	4	2,284	1,228	340	99·05	63·17	157·52	650	55·31	2	0·2	
	South " ...	15	15,180	1	...	2,400	926	3,326		421	306	727	609	96	...	705	...	2,599	1,915	155	96·89	78·36	172 59	862	56 78	7	0 5	
7	North Ward ...	16	26,752	1	...	3,615	1,153	4,768		590	456	1,046	888	136	...	1,024	1	3,722	3,013	193	97·99	85·38	150 90	1,532	57·26	8	0·3	
	Centre " ...	17	38,643	1	1	3,627	1,303	4,930		605	511	1,116	848	178	21	1,047	20	3,814	2,206	415	95·93	64·90	84·18	1,414	36·59	16	0·4	
	South " ...	18	32,851	...	...	2,822	1,161	3,983		572	493	1,065	840	159	13	1,012	20	2,918	1,715	361	96·84	67·07	83·01	1,472	44·80	15	0·5	
8	East Ward ...	19	34,358	1	1	2,684	1,285	4,979		552	513	1,065	717	280	4	1,001	26	2,904	1,696	705	96·34	77·13	78·49	1,051	33 79	14	0·4	
	West " ...	20	20 254	...	...	1,339	742	2,081		459	442	901	635	218	1	854	18	1,180	552	368	96·72	67·98	69·46	994	49 12	4	0·2	
	Total ...		518,660	14	10	41,471	21,075	62,546	6255	10,073	9,525	19 598	14,896	3,052	149	18,097	918	4,2948	23,548	7506	96·88	66·44	80 29	23,997	46·27	175	0·3	

5. PLAGUE.

Staff.

Plague measures were administered by the two Assistant Health Officers in their respective ranges. For observation of notification holders, and tracing of cases of Plague from amongst them, ten Plague Inspectors were employed throughout the year; but, of the six Plague Nurses, one resigned on 25th March and another died on 18th May 1916, and as no necessity for filling the vacancies so caused was felt, only four were on duty for the rest of the year. Further during the greater part of the year under review, three out of these four were deputed to Small-pox work where they did more useful work than they would have done in the Plague Section. The object with which they were employed originally was to observe Gosha women amongst notification holders. But in actual practice, such instances were so few and far between, and the work the Nurses did was so perfunctory, that their employment appeared superfluous. Their employment on duty, other than their own was "neither remarked nor remarkable." It was therefore decided to abolish altogether the posts of these six Plague Nurses from the commencement of the official year 1917-18.

Dr. C. Krishna Reddy, B.A., M.B. & C.M., continued to be in charge of the rat destruction operations in the city including the harbour.

Plague Administration.

The administration of this section may be divided into three main parts :

1. Inspecting vessels arriving at the Port and issue of notifications and practique for passengers. This work is under the supervision of the Port Health Officer who is also 2nd Surgeon, General Hospital.

2. Inspection and observation of arrivals from Plague infected areas under the new notification system and tracing of Plague cases.

3. Rat destruction.

(1) The following is the report of the Port Health Officer :

"229 incoming vessels carrying 23,761 crew and 83,336 passengers, of whom 58,232 landed here from Plague infected areas, were inspected during the year, as against 239 vessels with 23,787 crew and 67,610 passengers of the previous year. The decrease was very small and does not therefore need any explanation.

287 out-going vessels with 25,380 crew and 62,665 passengers were granted Bills of health during the year, as against 170 vessels with 17,318 crew and 37,038 passengers of the previous year. The large increase in the number of out-going vessels inspected for Bills of health was due to the fact that Small-pox was prevalent in Madras in an epidemic form during the greater part of the year and every vessel leaving the Port had to be inspected under the G. O. on the subject.

As usual, the 1st and 2nd class passengers that arrived from infected parts received notification papers and deck passengers had their personal effects disinfected before they were allowed to go ashore. Deck passengers leaving the Port for Ports out of India had their clothing, &c., disinfected before boarding the vessels. Disinfection is carried on with the aid of steam. There was no occasion to use the Clayton Apparatus during the year.

Three cases of Small-pox with two contacts, fifteen cases of Chicken-pox with three contacts, one case of suspected Measles, one case of Mumps, and two cases of Cholera, were found amongst the passengers and crew that arrived from infected parts and were removed to the Isolation Hospital at Krishnampet.

30 cases of Chicken-pox and 49 contacts from amongst the return emigrants were sent to the Emigration Depot at Cassimode.

The number of notification papers issued, during the year was 927 City and 4,764 Mofussil."

(2) Inspection and observation of arrivals from Plague infected areas : 56,854 triplicate copies of Plague notifications were received from the several notification stations. Of these, 40,621 or 71·59 *per cent.* were traced to the parties answering to them, 16,233 or 28·55 *per cent* were not traceable as against 17·04 *per cent* in the previous year. This is due to the fact that in a large number of cases incorrect and misleading addresses are given, while in others the parties, having come on temporary business, returned to the last station from which they arrived, or travelled further to some other station, without leaving their addresses in either case. There are, in addition to these, a number of triplicates of notification slips on which the addresses are written in a very illegible and unreadable manner.

36 prosecutions were launched against certain persons who failed not only to comply with the instructions given on the notification papers, but also to offer reasonable explanations for such noncompliance. 27 cases ended in conviction with fines varying from Annas eight to Rupees three ; one was pending at the end of the year, and the rest were either acquitted or struck off for the non-appearance of the parties, whose exact addresses subsequent to the prosecution were not traceable.

The following case is interesting to show that the notification rules may be evaded with a certain amount of impunity, the prosecution not ending in the defaulters being punished with anything resembling an exemplary punishment.

In September 1916, the Chief Medical Officer, Kolar Gold Fields, reported that one N. with his wife R suspected to be suffering from Plague in Champion Reef had removed to Madras to the house of one A. Fitter, Harbour Works, living in Portuguese Church Street. A. denied all knowledge of the parties. The Medical Officer on Plague inspection duty at Jalarpet on enquiry informed us that the husband and wife were given plague notification papers on the night of 23rd September 1916, but N did not deliver them to us, and probably they were destroyed by him. The Chief Medical Officer, Kolar Gold Fields, on further enquiry sent us a copy of letter, dated 25th September 1916, from the abovesaid N to his brother R L at Kolar Gold Fields saying that his wife was better and improving and that he would return on the following Tuesday. No. 8, Portuguese Church Street, was closely inspected but the parties could not be traced. On reports received from the neighbours a search was made in several parts of the City such as Ammen Coil Street, Georgetown, Vepery, Pudupet and Chintadripet, but the parties were not traced nor were they traceable in Pallavaram where, it was rumoured, they had gone.

On 25th November information was received from the Chief Medical Officer, Kolar Gold Fields, that the parties were in Kupamcheri, hamlet of Vengal, Tiruvellore Taluk. N and R-his wife, were prosecuted under the Plague notification rules for not delivering the notification papers. We were unable to proceed on other grounds for

want of evidence that one of them suffered from a dangerous disease probably Plague, and that the patient was removed from place to place thereby endangering public safety. They evaded summons for two or three weeks, and at last, they were traced to 103, Ammen Coil Street, on or about the 20th December 1916. The cases were heard on 27th January 1917 in the Georgetown Police Court with the result that N...was fined Rs. 3 and his wife R....Re. 1 for not tendering to us the Plague notifications and for evading our observation. N and R may be considered to have won the game.

Rat Destruction.

(3) 1,38,611 rats were caught and destroyed as against 1,33,970 in 1915. The grand total of rats thus destroyed since the beginning of the operations in July 1898 is 2,099,555. A certain number of rats from the daily catch were selected for dissection and microscopically examined to detect any signs of chronic or acute Plague in them. None were found so infected. During the year under review, special areas in the vicinity of houses where imported cases of Plague were reported, were trapped, and the rats caught were particularly examined for any signs of Plague, but with negative results.

Under the requisition of the Senior Member, Plague Research Commission, Bombay, 4,030 live rats were sent by rail to Bombay for experimental purposes.

Plague Cases.

There were 17 imported cases of plague during 1916, with 11 deaths. A brief summary of each of these cases is given at the end of this section and on analysis, it is found that the places from where the several cases were imported were as follows :

Within the Presidency.		*Outside the Presidency.*	
Coimbatore	1	Bangalore	1
Perundurai	1	Secunderabad	2
Salem	1	Poona	2
Ambur	1	Kurudwadi (Bombay Presidency.)	3
Gudiyatam	5		
	9		8

Of these 17 cases, 13 were bubonic, two septicaemic, one (suspicious pneumonic), one toxic.

Only 11 patients arriving from the infected areas mentioned above had Plague notification papers, the others evidently having either "evaded," or left the station just before it was declared Plague infected.

Seven cases were actually suffering from Plague before arriving at Madras ; eight developed Plague, one or two days after arrival, themselves being contacts of a case or cases of Plague in their last resident station ; two persons developed the disease after they were segregated in the Infectious Diseases Hospital as contacts of a previous imported case.

Three cases were reported after death, and diagnosis was confirmed by obtaining bloodsmears from the liver or spleen from the dead body in which the *bacillus pestis* was found ; 16 cases were traced by the Plague Inspectors or the Sanitary Inspectors who received the report either from the notification holder himself or from the residents in the locality where the case occurred.

The first case was reported on the 5th January 1916 and between this date and 25th September 1916 there was a lull. On the latter date, the next case, a boy arriving from Poona, was reported, and before the 6th October 1916, six more cases were imported into the city ; all the 16 cases occurred between 25th September and close of the year.

About this time Plague was very virulent in some parts of the Presidency, *e.g.*, Ambur, Gudiyatam, Salem and Coimbatore, and also outside, as in Poona, Secunderabad, and Hyderabad (Deccan). The last three places appear to have suffered most. Prompted partly by the fear of contracting the disease in their own stations and partly from the imaginary dread of the local Plague measures, a good many people left their infected places for uninfected localities ; and the city of Madras, which is a more or less a central place, naturally attracted people from many of these infected parts. Moreover the chances of success in importing actual Plague cases are much greater in a large city like Madras, than in the mofussil ; for when once the notification or detection is evaded by some means or other at the starting station, there is no further trouble as in old days, when there was an inspecting station at Basin Bridge and a second ordeal to be faced. It is probable that in a large busy Railway station like the Central, cases will escape notice.

The number of cases of Plague imported into the city was by far the largest for many years. In 1915 no cases were reported, in 1914 three, in 1913 two, in 1912 two and one in 1911 were recorded. This high record seems to me to be due, in part at least, to increased vigilence shown by the Plague and Sanitary Inspectors in the matter of tracing notification holders, in which task they were ably assisted by the active co-operation of our Medical Registrars. As soon as the first two cases occurred during the end of September 1916, Medical Registrars were requested to verify with greater precision causes of deaths attributed to sudden and sharp illness ; if, in any case their suspicions were roused, they had to communicate with the Sanitary and Plague Inspectors, who in their turn kept contacts and relatives of the deceased under observation for a period of one week or ten days.

Whatever may be the merits or demerits of the new Notification system, whether or not this or even the old Pass-port system has been instrumental in keeping Plague out of Madras, it cannot be denied that the abolition of the inspection station at Basin Bridge gave an impetus for smuggling acute cases of Plague into the City. To prevent the importation of such cases, it was considered desirable to make some form of temporary provision for inspection of incoming Railway passengers. With the willing co-operation of the authorities of the Madras and Southern Mahratta Railway Company, to whom I am very thankful, our Plague and Sanitary Inspectors were detailed at Basin Bridge and at Central Station to inspect every train coming into the City for suspicious cases being brought in. Remembering that within a radius of 100 to 150 miles of the City of Madras there are areas where annual visitations of Plague have unfortunately been only too common, it is difficult to say, why during previous years, there were no cases or only a few imported, into the City. There is, however, this fact to be remembered, that the epidemic in the territory round Madras was more severe and that a larger number of panic-stricken people rushed into the City during 1916, than during previous year or years.

The Sanitary Commissioner came down here on 5th October 1916, and expressed himself satisfied with the precautionary measures undertaken by us. The

rapid succession in which cases were reported during one fortnight between September and October made us very uneasy, and it looked for a time as though Madras would be visited, for the first time with an actual and not merely threatened epidemic of Plague. One set of cases in particular gave great cause for anxiety ; when a pilgrim party of over 45 people arrived in Madras *enroute* to Rameswaram, and a day after their arrival three of the party were found stricken with Plague. Two of the three subsequently died in hospital. The party had with them two lorry-loads of baggage including large quantities of articles of food, such as ghee, wheatflour, sugar, etc, suitable in every way for the harbourage of fleas or even infected rats. They also carried with them valuable fabrics of silk, wool &c. which could not, of course, be disinfected in the same way as cotton clothes.

Madras City offers every facility for an out-break of Plague, in case the infection is once introduced. Bubonic Plague is not communicated from man to man without the intermediary of an infected agent, namely, the rat-flea. It is generally accepted that the usual transmission of Plague is from rat to rat and from rat to man by the intermediary flea, whose permanent host is the rat. In the case of Pneumonic Plague, however, the infection is directly carried to the contacts or others coming in close proximity of the sick.

The Madras rat is highly susceptible to Plague, and it only requires the introduction of an infected flea to start an epizootic first and then an epidemic. It is therefore a matter of genuine satisfaction that the threatened epidemic was averted. How much of the credit for this immunity is due to human efforts, and how much to natural causes, it is not possible to say.

Preventive Measures.

The usual measures were taken as each case of Plague was reported. The patient and all the contacts, including the permanent residents of the house where the patient was found ill, were removed and isolated at Corporation expense in the Infectious Diseases Hospital. Where the hospital was not commodious enough to segregate contacts, the vacant rooms in the Old Fiji Emigration Depot grounds were availed for this purpose.

The infected house was immediately and completely evacuated, and after being thoroughly disinfected was kept uninhabited for a week or ten days. All the effects of the patient were either destroyed by fire or were soaked in lotion and dried.

Rat traps were placed in all the houses in close vicinity of the infected one and the locality itself trapped for rats for nearly two weeks. The rats so caught were examined by Dr. Krishna Reddy for signs of Plague, but none were found infected.

The Plague and Sanitary Inspectors visited the locality every day and with the help of the Medical Registrars scrutinised as to the causes of every suspicious sickness or death.

A Brief Summary of the Seventeen Imported Cases of Plague.

First case, dated 5th January 1916.

In Coimbatore, Banni Ram, a patient, had fever for two days. Left Coimbatore on 2nd January 1916 with two others (his adopted father and one Gopalaswami Naidu). Arrived in Madras at 7-30 A.M. on 3rd January 1916. Consulted at the out-patient department, General Hospital, soon after arrival at the Railway Station. A ward boy from the General Hospital accompanied them to the Isolation Hospital where Plague cases

are treated. Kept under observation by Sub-Assistant Surgeon of the Hospital. Fever 104 degrees and bubo in right groin was suspicious. Blood examination showed Plague *bacilli*.

Second case, dated 25th September 1916.

The patient Kannappan, his mother and two brothers arrived from Poona on the morning of 24th instant. While the duplicate copy of the Plague notification was being handed over, the matter was reported to the Plague Inspector who sent for the Sanitary Inspector and Assistant Health Officer, Dr. Isaac. There was an enlarged gland in the left axilla—very tender and painful. A little tenderness over the groins on both sides. Temperature during time of examination 103·4. Tongue coated. Eyes little congested. Pulse quick. Health Officer, Assistant Health Officer and Sanitary Inspector of the Division inspected the patient at noon, and the patient with the contacts was removed at once to the Infectious Diseases Hospital, Old Jail Street, for isolation and treatment.

Third case, dated 29th September 1916.

Deceased Ram Bai was a girl of 10 years. She was inoculated at Poona on the 24th instant, and was attacked with fever and pain in the right axilla, on the 28th instant after passing Raichur Railway Station. It is reported that she had fever (105 degrees) and she developed a bubo at the painful part, *i.e.*, right axilla. Party arrived at 6-30 P.M., on the 28th instant, and went to house No. 21, Office Venkatachella Mudali Street, Triplicane, Madras, where the girl died at 11-30 P.M., on the same day. On the receipt of information of her death the Circle Plague Inspector with the Sanitary Inspector of the Division and the Assistant Health Officer of the Range inspected the dead body. There was a bubo in the right axilla. A smear was obtained from the bubo for examination, and Plague *bacilli* were found in it.

Fourth case, dated 1st October 1916.

The deceased Kannu Rao was a boy of 14 years. It is reported that he was attacked with fever on 21st September 1916 while at Ambur. Four days after, a bubo formed in the right groin. He had delirium also. Left Ambur on the 28th Idem by night train and arrived at Madras at 8 A.M., and went to Jani Jahan Khan Road. Thence the patient was taken to Mambalam for treatment but he returned at once. While returning, the boy died on the way.

Fifth case, dated 1st October 1916.

The patient Bhooshanammal was attacked with fever on 19th September 1916, developed glands in the right groin on 21st September 1916. Left Ambur on 28th September 1916 by the night train and arrived at Madras on 29th September 1916, and went to house No. 211, Jani Jahan Khan Road. On arrival at Madras and since arrival, the fever left her.

Sixth case, dated 1st October 1916.

The patient Krishnajee Rao is one of the three contacts that accompanied the two Plague patients who came from Ambur secretly by the night train on 28th September 1916. He developed fever on the 30th Idem in the Isolation Hospital. The bubo was also noticed on 30th Idem. Delirious on 1st October 1916.

Seventh case, dated 1st October 1916.

The patient Bageerathammal arrived from Bangalore City on the evening of 27th September 1916, and was attacked with fever on the evening of 30th September 1916 and was removed to the Isolation Hospital, Krishnampet, on the night of 30th September 1916. Bubo in the right groin developed at the Hospital on 1st October 1916. Fever of 102 degrees on 1st October 1916. Delirium on the night of 30th September 1916.

Eighth case, dated 6th October 1916.

The infant aged three months was a contact of two cases of Plague reported already to have been imported from Ambur and was segregated at Krishnampet Isolation Hospital on 30th September 1916 along with others. The child had a temperature of 103 degrees on admission but exhibited no other symptoms of Plague. Temperature came down to 100 degrees on the next morning, and ranged between 100 and 101 degrees until on the evening of 3rd October 1916 when it went up to 103 degrees. The infant became unconscious, worked into convulsions, and died at 11 P.M., on the 3rd October 1916.

Ninth case, dated 14th October 1916.

The deceased Thyagarajan came from Secunderabad with his mother Kuppammal and brother Damodaram on Wednesday the 11th instant by 6 P.M. Bezwada Express. The mother said that he got fever after his arrival in Madras and became worse on Thursday. The fever was very high on Friday and he died at 5 A.M. the next day' No cough or sputam—no diarrhoea—no bubos palpable. The mother said that they were all inoculated a month ago at Secunderabad. But no inoculation certificate could be produced.

Tenth case, dated 31st October 1916.

Saraswathi Ammal left Perundurai *via* Erode on the 29th instant, and arrived in Madras on the 30th instant morning by Mettupalayam Mail. Fever was said to be noticed in the train. Dr. Damry was asked to see the patient on the night of the day of arrival. The doctor informed the Assistant Health Officer the same night that there was a suspicious case of Plague in this house. Dr. Isaac, Assistant Health Officer, North Range, examined the patient early the next morning and found the following :— Temperature high, pulse quick, patient tired and restless, and reluctant to answer questions. Palpation revealed a large bubo of the size of a lime on the right groin painted with some reddish stuff. No information was got from the people in the house as regards the gland and the treatment.

Eleventh case, dated 22nd November 1916.

The child Krishnammal, who is the patient and her mother were both inoculated at Secunderabad on the 22nd October and 3rd September 1916, respectively, and they hold inoculation certificates. They arrived in Madras on the 9th or 10th from Secunderabad. The exact date of arrival is not remembered. It is reported that the child had an attack of fever on the evening of the 19th instant, and before the next evening the fever increased in intensity and a swelling was noticed in the right axilla. On a report being received on the afternoon of 21st November 1916, the Assistant Health Officer went to the spot at once and suspecting it to be Plague decided to send the sick child and contacts to the Isolation Hospital. There was a lot of opposition and the people had practically to be dragged out of their house and by 5 P.M. he succeeded in having the house evacuated. At 6 P.M. on 21st November 1916, the Health Officer saw the child in the Kistnampet Isolation Hospital. The temperature was 102 degrees and

the gland in the axilla was of the size of a big lime, fairly hard and tender. The child's general condition was good and it was not possible to declare the case as Plague by the clinical symptoms above exhibited. Next morning the Health Officer saw the child again. Temperature 100 degrees—general condition better than yesterday. A smear from the gland was examined and found to contain *bacillus pestis*. From the present state of the child and the bubo it seems probable that the child must have had the onset of the symptoms at least a couple of days earlier than what is reported. No reports of any deaths amongst rats in the locality.

Twelfth case, dated 4th December 1916.

The patient Devali Bai was one of the party who arrived in Madras on 30th November 1916 at 8 A.M., by the Bombay Mail, *enroute* to Rameswaram. On the evening of 1st December 1916, she developed symptoms of fever and pain in the left axilla. Pandit Gopalacharlu was consulted on the evening of 2nd December 1916 and the Health Officer got a report in the midnight, *i.e.*, 1 A.M. on 3rd December 1916. He went to the spot early morning and with the help of two nurses had the woman examined. Temperature 102 degress. Bubo in axilla. The woman's condition appeared to be fairly good and she walked out to the carriage of her own accord. She was sent to the Kistnampet Isolation Hospital with two attendants along with the other two patients. The other contacts 38 in number were sent to Fiji Emigration Depot Grounds, Tiruvothiyur High Road, and were under observation. At Hospital a smear was obtained from the 'bubo' and it was found to contain Plague *bacilli*. After 2 P.M., the woman grew suddenly worse, collapsed and died at about 4 P.M.

Thirteenth case, dated 4th December 1916.

The patient Narayana Bai was one of the party who arrived in Madras on 30th November 1916 at 8 A.M., by the Bombay Mail, *enroute* to Rameswaram. On the evening of 1st December 1916, she developed symptoms of fever and pain in the left groin. Pandit Gopalacharlu was consulted on the evening of 2nd December 1916, and the Health Officer got a report in the midnight, *i.e.*, 1 A.M. on 3rd December 1916 : he went to the spot early morning and with the help of two nurses had the woman examined. Temperature 104' degrees. Bubo in the groin. The woman's condition appeared to be semiconscious and she was carried down by the two nurses to the carriage. She was sent to the Krishnampet Isolation Hospital with two attendants. At hospital a smear was obtained from the bubo and it was found to contain Plague *Bacilli*.

Fourteenth case, dated 4th December 1916.

The patient Kunthi Bai was one of the party who arrived in Madras on 30th November 1916 at 8 A.M. by the Bombay Mail, *enroute* to Rameswaram. On the evening of 1st December 1916, she developed symptoms of fever and severe headache. Pandit Gopalacharlu was consulted on the evening of 2nd December 1916 and the Health Officer got a report in the midnight, *i.e.*, 1 A.M. on 3rd December 1916. He went to the spot early morning and with the help of two nurses the patient came to the carriage. She was sent to the Kistnampet Isolation Hospital with one attendant. Contacts are shown in the report of Devala Bai, as well as their place of segregation. Temperature on 3rd December 1916 was 102 degrees. This morning the temperature is 101 degrees and as she developed symptoms of fever, &c., along with other two cases who each have a bubo, and as the fever is continuous and still persisting, I have taken it as a case of Plague, probably a mild attack.

Fifteenth case, dated 4th December 1916.

The patient Agilandammal came to Madras from Gudiyatham by the 2 o'clock morning train of the 3rd instant; her son said she had slight fever on alighting from the train. On examination she had a temperature of 103 degrees, a pulse of about 70, feeble and flickering at about 8 A.M. this morning. She had a bubo on the right inguinal region.

General condition—an aged and emaciated lady.

Sixteenth case, dated 17th December 1916.

The patient Summan Mull aged 16 years was serving under a Marwari merchant at Sevvapet in Salem Town. A couple of days before they left Salem there were rat falls three shops off the Marwari merchant's house. They changed to Arasipalayam, another part of Salem town. On the night of 15th December 1916, the patient and two contacts left for Madras. It is reported that the boy got fever on the way.

On the morning of 16th December 1916 when the South Indian Railway arrived, the Sanitary Inspector of 9th Division on duty at the platform of the Central Station on examination found that the boy had fever (temperature 101·6 degrees) and also complained of pain in the left groin where a bubo was found. The Sanitary Inspector at once sent the boy and his two companions to the Kistnampet Isolation Hospital. The Medical Officer of the Hospital obtained a smear from the bubo which on examination was full of *bacillus pestis*. It is to be noted that they hold Plague notifications, dated 15th December 1916.

Seventeenth case, dated 31st December 1916.

The deceased Arumuga Mudali came to Madras from Ambur on 26th December 1916, Tuesday morning. On Wednesday, 27th night, he got fever and his general condition was low. It is said that the man was a subject of Chronic Asthma and during his last sickness he developed cough and difficult breathing. On Saturday forenoon (30th December 1916) he grew worse and Dr. G. Narayanaswami Mudaliyar was then called in. The Medical Practitioner suspected the case to be one of Plague and informed the Health Officer. It is said that the man possessed a Plague notification which is reported to have been sent to the Health Officer. The Plague Inspector has not got it yet. Hence the first report was from the Medical Attendant. The Health Officer went at 4 P.M. by which time the man was dead. A smear from the liver was obtained at once which on examination was found to contain a few Plague *bacilli*. No sputum nor any juice from the lung could be obtained. There were no bubos.

APPENDIX.

ANNUAL FORM No. I A.—METEOROLOGICAL DATE—MADRAS.

LATITUDE 13° 4′ N.

LONGITUDE 80° 15′ E.

MONTHS.		Barometer.	Reading of Thermometer.						Difference between dew point temperature and mean air temperature.	Degree of humidity complete saturation being 100.	Prevailing direction of wind.	Rainfall.		
		Mean daily reading.	Dry. Maximum.	Dry. Minimum.	Dry. Mean daily range.	Dry. Mean daily value.	Dew point. Mean daily value.	Mean maximum solar radiation.				Number of days on which rain fall.	Total fall of rain during the month.	Maximum fall of rain during 24 hours.
		...	...	...	...	...	...	...	...	...	...	...	Inches.	Inches.
January	1916.	30·021	85·1	66·4	18·7	75·6	64·7	148·5	10·9	71	E. N. E.	1	0·04	0·04
February	„ ...	29·917	88·3	69·1	19·2	78·2	67·9	152·3	10·3	74	S. E. by E.	...	...	...
March	„ ...	·890	90·0	70·7	19·3	80·3	70·7	153·7	9·6	76	S. E. by E.	...	...	...
April	„ ...	·814	94·1	78·1	16·0	85·1	74·6	154·3	10·5	75	S. S. E.	1	0·02	0·02
May	„ ...	·731	96·8	80·7	16·1	87·5	75·5	149·9	12·0	72	S. E. by S.	3	0·84	0·81
June	„ ...	·642	99·8	80·5	19·3	87·2	70·0	152·4	17·2	61	S. W.	11	3·41	0·96
July	„ ...	·706	92·8	77·6	15·2	83·6	74·6	142·2	9·0	77	S. by E.	11	3·66	1·53
August	„ ...	·743	94·1	77·9	16·2	84·4	73·4	148·1	11·0	73	S. S. W.	10	2·20	0·63
September	„ ...	·712	93·6	78·0	15·6	84·5	74·2	155·2	10·3	75	S. W. by S.	14	2·92	0·98
October	„ ...	·778	89·0	76·3	12·7	81·6	74·4	146·0	7·2	82	S. by W.	15	15·30	5·09
November	„ ...	·879	85·5	73·7	11·8	78·8	72·9	144·1	5·9	84	E. by N.	18	14·17	2·95
December	„ ...	·944	83·7	69·7	14·0	76·1	67·0	149·3	9·1	76	N. E. by N.	8	3·91	1·37

Annual Form No. I.—Births registered by Wards during the year 1916.

1	2		3			4			5			6	7	8	9			10	11
Present Divisions.	Wards.	Corresponding old Divisions.	Population according to Census of 1911.			No. of Births Registered.			Ratio of Births *per* 1,000 of Population.			Number of Males born to every 100 Females born.	Excess of Births over Deaths *per* 1,000 of Population.	Excess of Deaths over Births *per* 1,000 of Population.	Mean ratio of Births *per* 1,000 during previous five years.			Still Births.	*Illegitimate Births.
			Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.				Males.	Females.	Total.		
1	East Ward ...	1	9,768	10,550	20,318	441	469	910	45·1	44·5	44·8	94·0	12·1	...	41·8	36·7	39·1	29	63
2	Centre " ..		20,396	20,239	40,635	936	978	1,914	45·9	48·3	47·1	95·7	5·8	...	39·1	36·1	37·6	143	109
3	West " ...		7,820	7,300	15,120	277	293	570	35·4	40·1	37·7	94·5	3·8	...	33·3	33·2	33·2	31	35
4	East Ward ..	3	8,557	6,007	14,564	262	246	508	30·6	41·0	34·9	106·5	2·0	..	30·9	40·1	34·7	24	11
5	Centre " ...		10,132	9,047	19,179	319	336	655	31·5	37·1	34·2	94·9	5·5	...	29·7	30·7	30·2	54	34
6	West " ...		12,027	10,446	22,473	459	427	886	38·2	40·9	39·4	107·5	4·4	...	31·3	33·6	32·4	38	30
7	North Ward ...	2	18,410	1,8655	37,065	751	787	1,558	40·8	42·2	42·0	95·6	8·6	...	35·4	32·6	34·0	30	52
8	Centre " ..		14,887	13,698	28,585	466	458	924	31·3	33·4	32·3	101·7	1·3	...	28·1	29·5	28·8	14	60
9	South " ...		11,210	9,727	20,937	383	341	724	34·2	35·1	34·6	112·3	...	4·4	27·7	32·2	29·8	27	35
10	4th Division ...	4	13,137	11,842	24,979	576	531	1,107	43·8	44·8	44·3	108·4	9·8	...	40·6	42·1	41·3	35	53
11	North Ward ..	5	21,157	20,366	41,523	936	978	1,914	44·2	48·0	46·1	95·7	11·9	...	39·1	40·0	39·5	57	79
12	Centre " ...		15,172	14,604	29,776	598	593	1,191	39·4	40·6	40·0	100·8	9·0	...	38·6	36·7	37·6	36	64
13	South " .		12,430	11,287	23,717	599	601	1,200	48·2	53·2	50·6	99·7	18·4	...	42·7	44·8	43·7	138	27
14	North Ward	6	6,216	5,535	11,751	228	239	467	36·7	43·2	39·7	95·4	7·3	...	32·8	34·3	33·5	12	29
15	South " ..		7,622	7,558	15,180	336	291	627	44·1	38·5	41·3	115·5	13·0	...	38·2	37·8	38·0	19	37
16	North Ward ...	7	13,601	13,151	26,752	602	615	1,217	44·3	46·8	45·5	97·9	10·1	...	41·3	39·8	40·6	36	40
17	Centre " ...		19,636	19,007	38,643	875	837	1,712	44·6	44·0	44·3	104·5	6·9	...	41·5	41·1	41·3	96	89
18	South " ..		16,724	16,127	32,851	657	680	1,337	39·3	40·7	40·7	96·6	3·2	...	38·4	39·0	38·7	57	70
19	East Ward ...	8	16,998	17,360	34,358	763	696	1,459	44·9	40·1	42·5	109·6	5·4	...	36·7	34·2	35·5	70	70
20	West " ...		10,565	9,689	20,254	402	413	815	38·1	42·6	40·2	97·3	11·3	...	40·5	44·7	42·5	29	52
	Total ...		266,465	252,195	518,660	10,866	10,809	21,675	40·8	42·9	41·8	100·5	7·3	...	36·9	37·1	37·0	975	1,039

* Included in the total Number of Births shown in column No. 4.

Annual Form No. II.—Statement of Deaths by Wards during the year 1916.

1	2		3	4	5			6			7	8															9		
Present Divisions.	Wards.	Corresponding old Divisions.	Area in Square Miles.	Average Population per Square Mile.	Population according to Census of 1911.			Number of Deaths Registered.			Number of Deaths of Males to every 100 Deaths of Females.	Deaths per 1,000 of Population from												All causes.			Mean ratio of Deaths per 1000 during previous five years.		
					Males.	Females.	Total.	Males.	Females.	Total.		Cholera.	Small-pox.	Measles.	Plague.	Malaria.	Enteric Fever.	Other Fevers.	Dysentery and Diarrhoea.	Tubercle.	Respiratory diseases.	Injury.	All other causes.	Males.	Females.	Total.	Males.	Females.	Total.
1	East Ward	1	0·92	22,085	9,768	10,550	20,318	343	322	665	106·5	...	0·8	0·7	...	2·5	00·5	1·4	7·2	1·4	3·3	0·2	15·1	35·1	30·5	32·7	48·9	46·5	47·7
2	Centre ,,		1·36	29,879	20,396	20,239	40,635	926	751	1,677	123·3	0·02	0·8	0·9	..	2·2	0·02	1·7	9·6	0·7	8·3	0·3	16·7	45·4	37·1	41·3	55·2	50·2	52·7
3	West ,,		3·03	4,990	7,820	7,300	15,120	258	255	513	101·2	...	0·3	3·3	...	3·1	...	1·5	6·4	0·6	8·4	0·4	12·8	33·0	34·9	33·9	52·2	55·1	53·6
4	East Ward	3	0·55	26,480	8,557	6,007	14,564	256	223	479	114·8	0·1	0·5	0·5	...	2·5	0·1	1·9	6·8	1·7	4·1	0·3	14·5	29·9	37·1	32·9	34·0	46·1	39·0
5	Centre ,,		0·21	91,329	10,132	9,047	19,179	281	268	549	104·9	0·1	0·6	0·7	0·05	2·7	0·1	0·2	5·3	0·9	6·3	0·3	11·4	27·7	29·6	28·6	31·7	34·4	33·0
6	West ,,		0·21	93,639	12,027	10,446	22,473	398	389	787	102·3	...	0·8	0·2	...	4·2	0·04	0·2	6·3	1·0	7·6	0·3	14·4	33·1	37·2	35·0	38·0	42·4	40·0
7	North Ward	2	0·42	88,250	18,410	18,655	37,065	583	655	1,238	112·3	...	0·8	..	0·03	1·0	0·1	0·5	5·6	2·7	4·7	0·2	17·8	31·7	35·1	33·4	41·4	43·1	42·3
8	Centre ,,		0·24	119,104	14,887	13,698	28,585	439	449	888	97·8	...	0·1	0·1	0·07	1·1	0·1	0·4	4·9	4·3	3·5	0·2	15·4	29·5	32·8	31·1	34·5	41·3	37·7
9	South ,,		0·36	58,158	11,210	9,727	20,937	459	356	815	128·9	...	0·7	0·4	0·05	0·8	0·2	1·3	4·1	4·6	8·7	1·0	17·1	40·9	36·6	39·0	45·3	39·9	42·8
10	4th Division	4	3·88	6,438	13,137	11,842	24,979	446	416	862	107·2	0·1	0·4	0·2	...	2·4	...	0·4	9·2	1·3	3·8	0·2	16·6	33·9	35·1	34·5	39·7	41·2	40·4
11	North Ward	5	0·70	59,319	21,157	20,366	41,523	703	715	1,418	98·3	0·1	0·4	0·1	...	2·5	0·05	0·5	8·8	1·7	4·0	0·2	13·3	33·2	35·1	34·1	39·2	42·0	40·6
12	Centre ,,		0·95	31,343	15,172	14,604	29,776	444	480	924	92·5	0·2	0·9	0·1	0·03	0·2	0·1	0·5	5·4	2·1	6·9	0·4	14·0	29·3	32·9	31·0	34·5	35·5	35·0
13	South ,,		1·16	20,446	12,430	11,287	23,717	393	370	763	106·2	...	1·3	0·4	...	0·4	0·1	0·3	7·8	1·1	3·2	0·2	17·4	31·6	32·8	32·2	33·1	39·2	36·0
14	North Ward	6	2·40	4,896	6,216	5,535	11,751	184	197	381	93·4	0·1	0·3	0·2	...	2·1	..	1·9	9·5	1·4	4·7	0·3	12·0	29·6	35·6	32·4	34·1	37·6	35·7
15	South ,,		1·76	8,625	7,622	7,558	15,180	225	204	429	110·3	...	0·8	0·3	..	0·7	...	1·7	6·4	1·1	3·9	0·2	13·1	29·5	27·0	28·3	35·2	35·1	35·1
16	North Ward	7	0·36	74,311	13,601	13,151	26,752	467	480	947	97·3	0·2	0·6	0·6	...	1·2	0·2	0·6	7·9	0·9	4·9	0·3	18·2	34·3	36·5	35·4	37·6	37·1	37·3
17	Centre ,,		1·83	21,116	19,636	19,007	38,643	708	737	1,445	96·1	...	1·5	1·6	0·03	0·3	0·2	1·9	5·8	1·8	6·7	0·1	17·4	36·1	38·8	37·4	41·3	44·6	42·4
18	South ,,		0·72	45,626	16,724	16,127	32,851	587	646	1,233	90·9	0·2	1·9	1·5	0·09	0·4	0·06	1·8	5·9	1·7	6·3	0·3	17·4	35·1	40·1	37·5	37·8	40·4	39·1
19	East Ward	8	2·64	13,014	16,998	17,360	34,358	652	620	1,272	105·2	0·1	1·7	0·7	..	0·8	0·1	0·4	9·3	1·2	5·3	0·2	17·0	38·3	35·7	37·0	37·1	38·7	37·9
20	Vest ,,		3·90	5,193	10,565	9,689	20,254	299	288	587	103·8	...	0.8	0·5	0·05	0·4	0·05	0·2	7·6	0·4	3·9	0·2	14·8	28·3	29·7	29·0	[illegible]	39·3	37·5
	Total ...		27·6	18,792	266,465	252,195	518,660	9,051	8,821	17,872	102·6	0·1	0·9	0·5	0·02	1·5	00·9	0·9	7·1	1·7	5·5	0·3	15·9	34·0	35·0	34·5	39·7	41·1	40·7

Annual Form No. III.—Deaths registered by Wards during each month of the year 1916.

1	2		3												4
Present Divisions.	Wards.	Corresponding old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total Deaths registered during the year.
1	East Ward ...	1	60	55	62	67	52	44	57	51	63	57	37	60	665
2	Centre " ...		170	149	169	140	130	99	131	137	143	139	124	146	1,677
3	West " ...		50	46	43	35	53	35	38	57	30	42	39	45	513
4	East Ward ...	3	52	49	53	41	43	33	35	37	36	29	37	34	479
5	Centre " ...		60	58	47	43	38	40	48	41	34	35	47	58	549
6	West " ...		65	74	81	61	68	53	65	67	64	51	56	82	787
7	North Ward ..	2	104	107	134	98	85	90	90	104	103	99	111	113	1,238
8	Centre " ...		82	78	70	78	75	64	71	88	67	83	45	87	888
9	South " ..		67	48	67	76	66	65	72	87	71	61	69	66	815
10	4th Division ...	4	92	68	99	68	68	65	78	67	69	52	63	73	862
11	North Ward ...	5	131	138	122	118	119	95	129	139	96	109	110	112	1,418
12	Centre " ...		77	67	78	94	72	53	73	98	87	76	77	72	924
13	South " ...		72	73	77	74	61	61	45	60	60	49	64	67	763
14	North Ward ...	6	30	40	27	41	36	30	28	44	33	27	21	24	381
15	South " ...		41	42	55	29	28	38	33	37	35	29	29	33	429
16	North Ward ...	7	85	104	78	93	101	57	86	82	63	71	56	71	947
17	Centre " ...		172	193	165	128	116	102	98	106	73	83	108	101	1,445
18	South " ...		146	168	133	108	96	66	70	87	82	81	93	103	1,233
19	East Ward ..	8	130	154	138	110	118	93	95	97	78	83	85	91	1,272
20	West " ...		51	50	56	42	62	43	48	53	51	49	38	44	587
...	Total ...		1,737	1,761	1,754	1,544	1,487	1,226	1,390	1,539	1,338	1,305	1,309	1,482	17,872

Annual Form No. IV.—Deaths registered according to Age by Wards during the year 1916.

1	2		3		4		5		6		7		8		9		10		11		12	
Present Divisions.	Wards.	Corresponding old Divisions.	Under 1 Year.		1 Year and under 5 Years.		5 Years and under 10 Years.		10 Years and under 15 Years.		15 Years and under 20 Years.		20 Years and under 30 Years.		30 Years and under 40 Years.		40 Years and under 50 Years.		50 Years and under 60 Years.		60 Years and upwards.	
			Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1	East Ward		123	125	65	56	18	7	6	5	4	9	16	22	21	25	18	10	21	12	51	51
2	Centre "	1	278	217	113	113	32	23	28	20	18	25	86	61	89	55	65	45	70	42	147	150
3	West "		79	69	31	24	9	13	12	4	9	12	21	37	19	23	19	17	14	19	45	37
4	East Ward		69	65	52	41	7	11	10	3	...	13	25	20	21	16	14	6	18	14	40	34
5	Centre "	3	86	85	36	41	9	12	9	3	4	14	20	37	26	13	29	8	17	18	45	37
6	West "		137	101	58	52	14	15	8	8	16	17	27	53	25	28	30	25	30	21	53	69
7	North Ward		196	214	69	60	15	19	19	11	14	36	39	75	45	47	47	24	39	32	100	137
8	Centre "	2	143	124	60	62	10	18	9	9	4	18	31	44	45	40	41	27	35	26	61	81
9	South "		100	92	51	50	11	13	14	14	10	21	52	49	49	27	55	25	51	18	66	47
10	4th Division	4	179	125	57	79	15	19	10	9	18	15	29	40	23	26	21	18	32	19	62	66
11	North Ward		254	227	110	110	16	32	15	15	10	20	51	65	45	35	34	46	44	42	124	123
12	Centre "	5	169	161	77	72	11	17	11	5	10	16	30	45	18	35	23	14	29	30	66	85
13	South "		156	104	66	65	16	16	10	8	3	16	21	42	24	24	18	21	18	15	61	59
14	North Ward	6	48	60	25	33	8	12	6	3	4	8	17	19	13	16	21	12	11	4	31	30
15	South "		86	54	29	24	8	5	2	4	5	10	10	20	16	15	14	7	11	16	44	49
16	North Ward		152	161	92	86	12	26	5	9	9	22	30	40	38	32	24	15	29	17	76	72
17	Centre "	7	231	227	126	124	35	36	14	21	9	32	56	58	32	52	52	33	40	31	113	123
18	South "		202	195	103	124	26	32	7	14	10	26	36	55	41	39	40	31	35	25	87	105
19	East Ward	8	237	191	108	108	32	37	10	16	15	16	45	52	46	39	35	30	37	33	87	98
20	West "		127	97	41	49	10	13	8	6	7	8	20	20	12	20	12	17	21	6	41	52
	Total...		3,052	2,694	1,369	1,373	314	376	213	187	179	354	662	854	648	607	612	431	602	440	1,400	1,505
	* Ratio per 1,000...		280·9	249·2	63·0	62·0	11·0	13·0	7·7	7·4	7·2	13·7	12·3	16·7	15·7	16·8	19·8	16·1	33·9	26·8	106·2	117·7

* In the case of children under one year of age, the rates are calculated on the number of Live births during the year ; in all other cases on the numbers living at the time of the Census.

Annual Form No. V.—Deaths registered according to Class by Wards during the year 1916.

1	2		3					4					5				
			Population (according to Census of 1911).					Number of deaths registered.					Ratio of deaths per 1,000 of Population.				
Present Divisions.	Wards.	Corresponding old Divisions.	Christians.	Hindus.	Mahomedans.	Others.	Total.	Christians.	Hindus.	Mahomedans.	Others.	Total.	Christians.	Hindus.	Mahomedans.	Others.	Total.
1	East Ward ...		5,271	13,976	1,015	56	20,318	118	483	64	...	665	22·4	34·5	63·1	...	32·7
2	Centre " ...	1	1,151	36,276	3,196	12	40,635	47	1,460	140	...	1,677	40·8	40·2	43·8	...	41·3
3	West " ...		327	12,502	2,193	98	15,120	10	424	79	...	513	30·6	34·9	36·0	...	33·9
4	East Ward ...		540	9,199	4,771	54	14,564	4	457	218	...	479	7·4	49·7	45·7	...	32·9
5	Centre " ...	3	2,672	15,477	965	65	19,179	51	467	29	2	549	19·1	30·2	30·1	30·8	28·6
6	West " ...		2,421	15,951	4,087	14	22,473	54	691	142	...	787	22·3	43·3	34·7	...	35·0
7	North Ward ...		1,891	33,769	1,357	48	37,065	52	1,129	55	...	1,238	27·5	33·4	40·5	...	33·4
8	Centre " ...	2	90	27,625	388	482	28,585	1	881	5	...	888	11·1	31·9	12·9	...	31·1
9	South " ...		962	19,634	276	65	20,937	83	720	11	1	815	86·3	36·7	39·9	15·4	38·4
10	4th Division ...	4	815	18,981	5,139	44	24,979	18	662	182	...	862	22·1	34·9	35·4	...	34·5
11	North Ward ...		4,176	36,638	643	66	41,523	90	1,291	37		1,418	21·6	35·2	57·5	...	34·1
12	Centre " ...	5	5,144	22,629	1,798	205	29,776	101	781	42	...	924	19·6	34·5	23·4	...	31·0
13	South " ...		4,176	17,399	2,053	89	23,717	115	574	73	1	763	27·5	33·0	35·6	11·2	32·2
14	North Ward ...	6	1,372	10,105	270	4	11,751	26	341	13	1	381	18·9	33·7	48·1	250 0	32.4
15	South " ...		2,141	11,589	1,384	66	15,180	41	341	47	...	429	19·1	29·4	34·0	...	28 3
16	North Ward ...		2,356	23,023	1,324	49	26,752	63	831	53	...	947	26·7	36·1	40·0	...	35·4
17	Centre " ...	7	483	23 215	14,934	11	38,643	9	831	605	...	1,445	18·6	35·7	40·5	...	27·4
18	South " ...		572	24,738	7,490	51	32,851	9	902	322	...	1,233	15·7	36·4	43 0	...	37·5
19	East Ward ...	8	2,806	26,006	5,274	272	34,358	66	981	225	...	1,272	23·5	38·1	42.7	...	37·0
20	West " ...		2,446	17,176	612	18	20,254	56	521	10	...	587	22·9	30 3	16·3	...	29·0
...	Total ...		41,812	415,910	59,169	1,769	518,660	1,014	14,501	2,352	5	17,872	24·3	34·9	39·8	2·8	34·5

Annual Form No. VI.—Deaths registered from *Cholera* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present divisions.	Wards.	Corresponding old divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2·2
2	Centre ,, ...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	0·05	...	0·02	1·4
3	West ,, ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1·5
4	East Ward ...		...	1	...	...	...	...	...	...	...	...	...	...	...	1	1	...	0·2	0·1	0·5
5	Centre ,, ...	3	1	...	...	...	...	...	1	...	...	...	...	...	2		2	0·2	...	0·1	0·8
6	West ,, ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1·2
7	North Ward ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...		1·1
8	Centre ,, ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·9
9	South ,, ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·8
10	4th Division ...	4	...	...	...	...	...	...	...	...	...	...	...	2	1	1	2	0·1	0·1	0·1	0·9
11	North Ward ...		1	2	...	...	...	...	...	...	...	...	...	...	1	2	3	0·05	0·1	0·1	0·9
12	Centre ,, ...	5	7	...	...	...	...	...	...	...	...	...		...	4	3	7	0·3	0·2	0·2	1·2
13	South ,, ...		...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	1·4
14	North Ward ...		...	1	...	...	...	...	...	...	...	...	...	...	1	...	1	0·2	...	0·1	0·9
15	South ,, ...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·7
16	North Ward ...		...	4	...	...	...	...	1	...	...	...	...	...	1	4	5	0·1	0·3	0·2	1·1
17	Centre ,, ...	7	...	...			...	...	...	...	...	...	...	...	...	...	...	...	...	...	1·6
18	South ,, ...		...	5	...	...	...	1	...	...	...	...	...	...	2	4	6	0·1	0·2	0·2	0·9
19	East Ward ...	8	...	1	...	...	...	...	1	...	...	...	...	...	1	1	2	0·1	0·1	0·1	1·4
20	West ,, ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	0·8
...	Total ...		10	14	...	...	...	1	3	...	...	...	...	2	14	16	30	0·1	0·1	0·1	1·1

Annual Form No. VII.—Deaths registered from *Small-pox* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward	1	...	4	4	3	1	1	...	1	1	...	1	...	8	8	16	0·8	0.8	0·8	0·7
2	Centre „		1	2	7	5	7	5	3	...	1	...	...	1	23	9	32	1·1	0·4	0·8	0·3
3	West „		...	...	1	1	1	...	...	1	...	1	...	...	2	3	5	0·3	0.4	0·3	0·1
4	East Ward	3	...	1	2	3	...	...	...	1	...	...	...	...	7	...	7	0·8	...	0·5	0·4
5	Centre „		3	5	3	1	...	...	...	...	...	...	...	...	7	5	12	0·6	0·6	0·6	0·5
6	West „		1	2	3	2	...	1	3	1	1	2	...	2	10	8	18	0·8	0·8	0·8	0·2
7	North Ward	2	...	4	10	3	2	4	1	1	3	1	2	...	13	18	31	0·7	1·8	0·8	0·3
8	Centre „		2	...	2	6	1	5	5	3	2	2	1	1	16	14	30	1·1	1·0	0·1	0·4
9	South „		...	1	2	3	1	1	1	4	...	1	...	...	6	8	14	0 5	0.8	0 7	0·3
10	4th Division... ...	4	...	...	1	3	4	...	1	...	...	...	...	...	5	4	9	0·4	0.3	0·4	0·04
11	North Ward	5	2	1	8	1	4	1	3	...	...	1	...	...	4	12	16	0·2	0.6	0·4	0·2
12	Centre „		3	2	7	6	4	1	8	1	...	...	1	...	14	14	28	0·9	1.0	0·9	0·1
13	South „		2	7	12	5	3	2	...	...	...	...	...	...	13	18	31	1·0	1·6	1·3	0·3
14	North Ward	6	...	...	1	2	...	...	...	...	...	...	...	...	1	2	3	0·2	0·4	0·3	0·1
15	South „		4	1	5	2	...	...	...	...	...	...	...	...	5	7	12	0·7	0·9	0·8	0·4
16	North Ward	7	4	4	4	1	2	1	1	...	...	...	...	...	6	11	17	0·4	0·8	0·6	0·3
17	Centre „		13	12	12	11	4	...	4	1	...	...	...	...	24	33	57	1·2	1·7	1 5	0·4
18	South „		13	18	15	11	1	2	...	...	1	...	...	...	32	29	61	1·9	1·8	1·9	0·4
19	East Ward	8	14	16	16	5	...	3	1	4	...	1	...	1	36	25	61	2·2	1·5	1·7	0·3
20	West „		2	...	3	1	2	2	2	1	1	1	...	1	7	9	16	0·6	0·9	0·8	0·1
	Total ...	...	64	80	113	75	37	29	28	19	10	10	5	6	239	237	476	0·9	0·9	0·9	0·3

Annual Form No. VIII.—Deaths registered from *Measles* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward		2	...	3	2	1	1	2	2	...	2	...	...	9	6	15	0·9	0·6	0·7	0·4
2	Centre "	1	2	5	5	7	7	3	2	3	1	1	...	...	20	16	36	1·0	0·8	0·9	0·3
3	West "		...	2	1	1	...	...	...	...	..	...	...	1	2	3	5	0·3	0·4	0·3	0·9
4	East Ward		1	1	2	1	1	...	2	...	...	...	...	...	5	3	8	0·6	0·5	0·5	0·2
5	Centre "	3	1	6	2	4	...	...	...	...	...	...	...	...	6	7	13	0·6	0·8	0·7	0·1
6	West "		...	...	3	1	...	...	...	...	...	...	...	1	2	3	5	0·2	0·3	0·2	0·1
7	North Ward		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·05
8	Centre "	2	...	1	...	1	...	...	...	...	...	...	...	...	...	2	2	...	0·1	0·1	0·1
9	South "		...	2	1	3	...	...	1	...	...	1	...	...	1	7	8	0·1	0·7	0·4	0·2
10	4th Division	4	...	..	3	2	...	...	...	1	...	...	...	...	2	4	6	0·2	0·3	0·2	0·1
11	North Ward		...	1	1	2	...	...	...	2	...	...	...	...	2	4	6	0·1	0·1	0·1	0·1
12	Centre "	5	1	...	...	...	1	1	...	...	...	...	...	...	2	1	3	0·1	0·1	0·1	0·1
13	South "		...	...	2	6	1	...	...	...	...	...	...	1	3	7	10	0·2	0·6	0·4	0·1
14	North Ward... ...	6	...	1	...	...	1	...	...	...	...	...	...	...	1	1	2	0·2	0·2	0·2	0·09
15	South "		1	2	2	...	..	...	...	...	...	...	...	...	4	1	5	0·5	0·1	0·3	0·1
16	North Ward		1	3	3	5	1	...	...	2	...	...	...	...	6	9	15	0·4	0·7	0·6	0·2
17	Centre "	7	13	18	13	8	1	2	4	2	...	...	...	...	28	33	61	1·4	1·7	1·6	0·5
18	South "		12	18	10	6	...	...	1	1	...	...	...	...	22	26	48	1·3	1·6	1·5	0·4
19	East Ward... ...	8	1	3	7	6	1	1	2	1	...	...	...	1	8	15	23	0·5	0·9	0·7	0·2
20	West "		1	2	...	...	...	3	...	...	2	1	1	1	5	6	11	0·5	0·6	0·5	0·2
	Total...	...	36	65	58	55	15	11	14	14	3	5	1	5	128	154	282	0·5	0·6	0·5	0·2

Annual Form No. IX.—Deaths registered from *Plague* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·01
2	Centre "		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·005
3	West "		...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
4	East Ward ...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	Centre "		...	...	...	...	...	...	...	...	...	...	1	...	...	1	1	...	0·1	0 05	0·01
6	West "		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	North Ward	2	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	0·05	0·03	...
8	Centre "		...	...	...	...	...	...	...	...	...	...	...	2	...	2	2	...	0·1	0·07	...
9	South "		...		...	...	...	...	...	...	...	...	...	1	1	...	1	0·09	...	0·05	0·02
10	4th Division	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	North Ward... ...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Centre "		...	...	...	...	...	...	...	...	...	1	...	...	1	...	1	0·07	...	0·03	...
13	South "		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·01
14	North Ward... ...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	South "		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	North Ward... ...	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Centre "		...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	...	0·05	0·03	...
18	South "		...	...	...	...	...	...	...	...	1	1	...	1	2	1	3	0·1	0·06	0·09	0·01
19	East Ward	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0 01
20	West "		...	...	...	...	...	...	...	...	...	1	...	...	...	1	1	...	0·1	0·05	...
	Total...		...	...	...	...	...	...	...	...	2	3	1	5	4	7	11	0·02	0·03	0 02	0·004

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Annual Form No. X.—Deaths registered from *Malaria* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward	1	3	1	5	6	3	2	6	6	5	4	2	8	29	22	51	3·0	2·1	2·5	7·4
2	Centre „		24	7	5	6	5	4	4	11	6	6	5	6	50	39	89	2·5	1·9	2·2	8·7
3	West „		15	5	3	1	2	...	2	4	2	3	4	6	26	21	47	3·3	2·9	3·1	12·5
4	East Ward	3	4	4	2	...	2	5	3	1	4	4	6	1	19	17	36	2·2	2·8	2·5	6·6
5	Centre „		9	4	4	3	4	2	4	3	5	5	7	2	29	23	52	2·9	2·6	2·7	5·7
6	West „		8	6	11	7	14	6	9	9	6	8	2	9	47	48	95	3·9	4·6	4·2	8·5
7	North Ward	2	4	1	5	1	4	4	4	2	5	1	2	3	22	14	36	1·2	0·8	1·0	7·3
8	Centre „		2	1	2	3	5	8	2	2	4	...	2	1	14	18	32	0·9	1·3	1·1	6·9
9	South „		1	2	1	3	2	1	2	...	1	1	2	...	9	7	16	0·8	0·7	0·8	5·4
10	4th Division	4	8	3	10	4	4	2	5	4	6	4	3	7	30	30	60	2·3	2·5	2·4	3·4
11	North Ward	5	12	10	9	11	8	10	10	7	7	7	8	6	49	56	105	2·3	2·7	2·5	4·3
12	Centre „		...	...	1	...	...	...	...	...	1	1	...	3	2	4	6	0·1	0·3	0·2	2·7
13	South „		3	...	...	1	...	1	1	1	1	...	...	1	5	4	9	0·4	0·4	0·4	2·0
14	North Ward	6	...	5	2	1	...	...	2	4	3	2	2	4	10	15	25	1·6	2·7	2·1	2·1
15	South „		...	1	...	1	...	...	...	6	1	...	2	...	6	5	11	0·8	0·7	0·7	1·8
16	North Ward	7	5	1	4	5	3	1	4	1	3	2	1	1	11	20	31	0·8	1·5	1·2	2·4
17	Centre „		1	2	2	1	..	2	...	3	...	...	2	...	8	5	13	0·4	0·3	0·3	1·7
18	South „		...	4	1	...	...	1	...	1	...	...	2	4	6	7	13	0·4	0·4	0·4	2·1
19	East Ward	8	3	5	3	2	1	1	1	3	3	1	2	3	20	8	28	1·2	0·5	0·8	4·9
20	West „		1	2	1	1	...	...	...	1	1	...	1	...	5	3	8	0·5	0·3	0·4	5·3
	Total...	...	103	64	71	57	57	50	59	69	64	49	55	65	397	366	763	1·5	1·5	1·5	5·0

Annual Form No. XI.—Deaths registered from *Enteric Fever* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward ...		1	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	0·09	0·05	0·1
2	Centre " ...	1	...	...	...	...	...	...	...	...	1	...	...	...	1	..	1	0·05	...	0·02	0·02
3	West " ...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·07
4	East Ward ...		...	...	...	...	1	...	...	...	...	1	...	...	2	...	2	0·2	...	0·1	0·1
5	Centre " ...	3	...	...	...	...	...	...	1	...	...	...	...	1	1	1	2	0·1	0·01	0·1	0·2
6	West " ...		...	...	...	..	1	...	...	...	...	...	...	...	...	1	1	...	0·01	0·04	0·2
7	North Ward ...		...	...	...	..	...	1	1	...	...	1	...	1	3	1	4	0·2	0·05	0·1	0·1
8	Centre " ...	2	...	1	..	1	...	...	...	1	...	...	...	...	1	2	3	0·07	0·1	0·1	0·03
9	South " ..		1	...	...	...	1	...	...	...	1	...	2	..	4	1	5	0·4	0·1	0·2	0·2
10	4th Division ...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·04
11	North Ward ...		...	...	...	1	1	...	...	...	...	...	...	...	1	1	2	0·05	0·05	0·05	0·05
12	Centre " ...	5	...	1	...	...	...	...	...	...	1	1	...	...	2	1	3	0·1	0·07	0·1	0·1
13	South " ...		...	...	..	...	...	2	...	1	...	...	...	...	...	3	3	...	0·3	0·1	0·08
14	North Ward ...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	South " ...		...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	..	0·2
16	North Ward ...		...	1	1	...	...	1	..	...	2	...	...	...	1	4	5	0·07	0·3	0·2	0·07
17	Centre " .	7	1	...	1	...	2	1	1	...	2	1	...	...	6	3	9	0·3	0·2	0·2	0·2
18	South " ..		...	...	1	...	...	...	...	1	...	...	...	...	1	1	2	0·06	0·06	0·06	0·2
19	East Ward ...	8	...	...	...	...	1	2	1	...	...	...	1	...	1	4	5	0·06	0·2	0·1	0·1
20	West " ...		...	...	...	.	...	...	...	...	1	..	...	...	1	...	1	0·09	. .	0·05	0·2
	Total ..	...	3	3	3	2	7	7	4	3	8	4	3	2	25	24	49	0·09	0·1	0·09	0·1

Annual Form No. XII.—Deaths registered from *Other Fevers* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of Deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward ...	1	3	4	5	4	...	...	3	1	4	2	...	3	12	17	29	1·2	1·6	1·4	4·1
2	Centre „ ...		10	6	7	8	2	1	8	6	8	5	4	4	29	40	69	1·4	2·0	1·7	4·5
3	West „ ...		...	2	4	5	2	2	1	1	1	1	...	3	7	16	23	0·9	2·2	1·5	4·8
4	East Ward ...	3	4	4	5	3	...	1	1	1	3	...	2	3	8	19	27	0·9	3·2	1·9	2·1
5	Centre „ ...		...	..	2	...	...	1	...	...	...	...	...	...	1	2	3	0·1	0·2	0·2	1·1
6	West „ ...		...	1	2	1	...	...	...	...	...	...	...	...	3	1	4	0·2	0·1	0·2	1·2
7	North Ward ...	2	...	3	...	3	1	3	...	4	2	1	...	...	7	10	17	0·4	0·5	0·5	1·5
8	Centre „ ..		1	1	...	2	2	1	1	2	..	1	...	...	7	4	11	0·5	0·3	0·4	1·2
9	South „ ...		7	...	...	4	3	4	2	1	2	2	...	2	14	13	27	1·2	1·3	1·3	1·1
10	4th Division ...	4	1	1	2	...	1	...	...	1	2	1	...	1	8	2	10	0·6	0·2	0·4	0·9
11	North Ward ...	5	2	3	2	1	1	1	2	1	3	2	1	2	12	9	21	0·6	0·4	0·5	1·4
12	Centre „ ...		3	1	3	1	1	...	2	2	1	1	1	..	10	6	16	0·6	0·4	0·5	1·7
13	South „ ...		...	1	2	1	...	..	1	1	...	...	...	1	2	5	7	0·2	0·4	0·3	1·1
14	North Ward ...	6	2	2	...	6	2	...	2	4	...	2	1	1	6	16	22	1·0	2·9	1·9	1·3
15	South „ ...		5	1	2	4	3	3	...	2	3	...	1	2	10	16	26	1·3	2·1	1·7	1·4
16	North Ward ...	7	1	2	2	4	2	...	1	..	1	...	...	2	5	10	15	0·4	0·8	0·6	0·6
17	Centre „ ...		7	10	12	6	3	7	5	6	3	2	8	5	27	47	74	1·4	2·4	1·9	1·1
18	South „ ...		3	12	7	9	4	3	3	4	4	3	3	5	27	33	60	1·6	2·0	1·8	1·0
19	East Ward ...	8	1	...	2	1	...	...	1	1	1	3	1	2	8	5	13	0·5	0·3	0·4	0·9
20	West „ ...		...	3	...	...	...	...	..	...	...	1	1	...	3	2	5	0·3	0·2	0·2	0·9
	Total ...	...	51	57	59	63	27	27	33	38	38	27	23	36	206	273	479	0·8	1·1	0·9	1·7

Annual Form No. XIII.—Deaths registered from *Dysentery and Diarrhœa* by Wards during each month of the year 1916.

1	2		3												4			5			6
															Total.			Ratio of deaths per 1,000 of Population.			
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean ratio per 1,000 during previous five years.
1	East Ward ...	1	18	15	13	6	17	12	11	8	14	8	10	15	82	65	147	8·4	6·2	7·2	11·6
2	Centre " ...		32	48	40	24	23	21	35	36	38	33	20	41	208	183	391	10·2	9·0	9·6	13·6
3	West " ...		4	7	8	6	12	5	7	15	8	9	7	9	50	47	97	6·4	6·4	6·4	13·4
4	East Ward ...	3	5	12	9	16	7	10	10	8	5	1	9	7	56	43	99	6·6	7·2	6·8	7·7
5	Centre " ...		13	7	7	10	10	10	8	6	4	7	8	12	52	50	102	5·1	5·5	5·3	6·4
6	West " ...		17	12	16	5	12	8	12	13	13	8	12	15	66	75	141	5·5	7·2	6·3	7·7
7	North Ward ...	2	11	11	11	13	5	19	18	34	21	17	20	29	90	119	209	4·9	6·4	5·6	6·6
8	Centre " ...		12	7	5	7	11	13	16	21	9	18	5	15	67	72	139	4·5	5·3	4·9	5·5
9	South " ...		3	1	8	4	5	4	5	15	16	7	6	12	51	35	86	4·5	3·6	4·1	5·7
10	4th Division ..	4	30	21	27	18	13	22	20	16	15	11	16	20	114	115	229	8·7	9·7	9·2	13·9
11	North Ward ...	5	37	29	33	28	38	27	30	36	23	26	29	29	187	178	365	8·8	8·7	8·8	13·4
12	Centre " ...		9	7	8	14	14	13	20	24	15	7	13	18	77	85	162	5·1	5·8	5·4	8·4
13	South " ...		19	19	16	19	21	18	4	16	13	14	10	15	97	87	184	7·8	7·7	7·8	9·1
14	North Ward ...	6	10	11	9	10	6	12	10	19	8	5	5	7	60	52	112	9·7	9·6	9·5	11·1
15	South " ...		11	11	15	5	8	9	8	7	9	3	7	4	50	47	97	6·6	6·2	6·4	11·2
16	North Ward ..	7	19	22	13	19	26	10	21	19	16	17	10	19	106	105	211	7·8	7·9	7·9	7·8
17	Centre " ..		31	27	30	20	18	10	17	15	10	14	13	19	108	116	224	5·5	6·1	5·8	7·4
18	South " ...		25	22	21	15	17	12	7	21	10	14	19	11	87	107	194	5·2	6·4	5·9	6·9
19	East Ward ...	8	45	49	28	27	30	27	17	23	20	18	19	18	151	170	321	8·9	9·8	9·3	11·3
20	West " ...		7	17	17	7	21	10	14	15	17	6	8	15	74	80	154	7·0	8·3	7·6	11·7
	Total ...	...	358	355	334	273	314	272	290	367	284	243	244	330	1,833	1,831	3,664	6·9	7·3	7·1	9·5

Annual Form No. XIV.—Deaths registered from *Tubercle including Tubercle of the Lung* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward ...	1	5	2	...	2	1	3	4	3	1	5	...	2	17	11	28	1·7	1·0	1·4	1·0
2	Centre " ...		7	3	1	...	2	4	1	1	2	...	4	5	15	15	30	0·7	0·7	0·7	1·2
3	West " ...		5	2	...	...	...	...	...	1	...	1	...	...	6	3	9	0.8	0·4	0·6	0·8
4	East Ward ...	3	6	4	2	...	3	1	1	...	2	4	1	1	9	16	25	1·1	2·7	1·7	1·5
5	Centre " ...		2	...	2	2	...	3	2	2	2	1	...	1	6	11	17	0·6	1·2	0·9	0·9
6	West " ...		1	3	6	...	1	...	1	...	1	5	1	3	13	9	22	1·1	0·9	1·0	1·1
7	North Ward ...	2	9	10	17	9	6	4	6	5	6	8	14	6	51	49	100	2·8	2·6	2·7	1·7
8	Centre " ...		16	8	13	11	8	1	7	16	12	8	5	19	70	54	124	4·7	3·9	4·3	1·6
9	South " ...		7	7	4	9	6	10	8	10	7	8	14	7	56	41	97	5.0	4·2	4·6	1·9
10	4th Division ...	4	2	1	5	3	2	1	4	3	2	4	3	2	14	18	32	1·1	1·5	1·3	0·9
11	North Ward ...	5	7	9	9	8	3	2	3	8	4	4	5	9	32	39	71	1·5	1·9	1·7	1·3
12	Centre " ...		6	3	4	7	7	3	2	7	2	10	7	4	28	34	62	1·8	2·3	2·1	1·2
13	South " ...		6	1	2	3	3	1	...	2	2	2	3	2	15	12	27	1·2	1·1	1·1	1·1
14	North Ward ...	6	2	...	1	1	...	3	...	2	5	3	...	...	10	7	17	1·6	1·3	1·4	1·4
15	South " ...		...	3	2	1	...	4	1	...	1	2	1	2	9	8	17	1·2	1·1	1·1	1·1
16	North Ward ...	7	1	2	2	2	2	1	...	5	2	3	2	1	10	13	23	0·7	1·0	0·9	1·5
17	Centre " ...		7	9	8	5	7	6	6	8	6	3	...	4	36	33	69	1·8	1·7	1·8	1·7
18	South " ...		3	7	7	5	6	6	4	5	5	4	1	3	21	35	56	1·3	2·2	1·7	1·7
19	East Ward ...	8	1	2	1	2	4	1	4	5	3	6	6	7	20	22	42	1·2	1·3	1·2	0·9
20	West " ...		...	1	...	2	1	1	1	...	...	...	2	...	1	7	8	0·09	0·7	0·4	1·0
	Total...	...	93	77	86	72	62	55	55	83	65	81	69	78	439	437	876	1·6	1·7	1·7	1·3

Annual Form No. XV.—Deaths registered from *Respiratory Diseases excluding Tubercle of the Lung* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. Males.	Total. Females.	Total. Total.	Ratio of deaths per 1,000 of Population. Males.	Ratio of deaths per 1,000 of Population. Females.	Ratio of deaths per 1,000 of Population. Total.	Mean ratio per 1,000 during previous five years.
1	East Ward	1	3	9	4	8	8	4	5	7	5	2	8	4	44	23	67	4·5	2·2	3·3	2·0
2	Centre "	1	17	26	37	24	40	14	31	30	35	33	25	27	196	143	339	9·6	7·1	8·3	1·6
3	West "	1	3	8	10	11	17	16	8	18	8	10	9	9	68	59	127	8·7	8·1	8·4	1·5
4	East Ward	3	4	7	10	5	7	1	3	9	4	4	4	1	36	23	59	4·2	3·8	4·1	4·6
5	Centre "	3	15	17	7	8	8	4	9	12	8	9	10	14	67	54	121	6·6	6·0	6·3	5·6
6	West "	3	9	18	16	12	14	18	14	14	15	9	12	20	89	82	171	7·4	7·8	7·6	6·5
7	North Ward	2	19	25	21	15	13	12	9	17	11	12	5	14	89	84	173	4·8	4·5	4·7	4·6
8	Centre "	2	6	10	12	4	15	11	6	6	2	13	11	4	46	54	100	3·0	3·9	3·5	4·5
9	South "	2	19	12	14	15	14	19	21	17	13	19	9	10	93	89	182	8·3	9·1	8·7	7·4
10	4th Division	4	9	10	11	6	11	6	12	10	7	4	3	5	42	52	94	3·2	4·4	3·8	5·4
11	North Ward	5	14	17	14	11	12	15	16	22	9	10	11	16	88	79	167	4·2	3·9	4·0	3·7
12	Centre "	5	19	14	25	23	11	11	11	28	16	20	14	14	104	102	206	6·9	7·0	6·9	5·1
13	South "	5	5	8	7	8	4	9	5	5	9	2	4	9	40	35	75	3·2	3·1	3·2	3·6
14	North Ward	6	6	2	6	8	11	4	2	3	4	6	1	2	24	31	55	3·9	5·6	4·7	4·7
15	South "	6	11	2	3	3	8	5	1	10	5	3	5	3	34	25	59	4·5	3·3	3·9	4·8
16	North Ward	7	6	15	17	15	13	9	11	11	6	14	...	13	83	47	130	6·1	3·6	4·9	5·7
17	Centre "	7	26	36	29	28	22	20	13	19	9	10	26	20	125	133	258	6·4	7·0	6·7	6·9
18	South "	7	18	28	19	17	12	12	16	9	11	17	24	23	93	113	206	5·6	7·0	6·3	6·5
19	East Ward	8	16	26	26	9	23	11	12	15	16	13	6	10	98	85	183	5·8	4·9	5·3	2·9
20	West "	8	10	8	6	4	8	7	7	7	3	5	7	7	48	31	79	4·5	3·2	3·9	2·4
	Total ..	...	235	298	294	234	271	208	212	269	196	215	194	225	1,507	1,344	2,851	5·7	5·3	5·5	4·5

Annual Form No. XVI.—Deaths registered from *Injuries* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of Population.			Mean ratio per 1,000 during previous five years.
															Males.	Females.	Total.	Males.	Females.	Total.	
1	East Ward	1	...	...	...	1	..	...	...	...	2	1	...	...	3	1	4	0·3	0·1	0·2	0·3
2	Centre "		3	2	1	...	2	...	...	1	...	2	1	...	6	6	12	0·3	0·3	0·3	0·4
3	West "		2	1	...	...	3	...	...	...	...	...	...	.	1	5	6	0·1	0·7	0·4	0·3
4	East Ward	3	...	2	...	...	...	...	...	...	..	1	2	...	5	...	5	0·6	...	0·3	0·4
5	Centre "		...	...	1	1	1	...	...	...	...	...	3	...	5	1	6	0.5	0·1	0·3	0·2
6	West "		1	...	1	...	...	...	1	2	...	...	...	1	4	2	6	0·3	0·2	0·3	0·2
7	North Ward	2	...	2	...	...	1	3	...	...	2	...	1	...	8	6	9	0·2	0·3	0·2	0·2
8	Centre "		1		1	...	1	1	...	..	...	2	...	...	4	2	6	0·3	0·1	0·2	0·2
9	South "		1	2	...	...	2	2	3	4	2	1	2	1	14	6	20	1·2	0·6	1·0	0·6
10	4th Division	4	..	...	...	1	1	1	1	...	...	...	...	...	4	...	4	0·3	...	0·2	0·3
11	North Ward	5	...	1	...	...	3	1	...	...	3	1	...	...	5	4	9	0·2	0·2	0·2	0·02
12	Centre "		2	2	1	1	...	1	1	...	...	1	...	2	7	4	11	0·5	0·3	0·4	0·3
13	South "		1	1	...	1	...	...	...	..	...	1	1	...	3	2	5	0·2	0·2	0·2	0·3
14	North Ward	6	...	...	1	...	1	...	1	...	...	...	...	...	1	2	3	0·2	0·4	0·3	0·3
15	South "		...	...	...	...	...	...	...	1	1	...	...	1	1	2	3	0·1	0·3	0·2	0·2
16	North Ward	7	1	1	...	..	2	...	2	...	1	2	...	...	6	3	9	0·4	0·2	0·3	0·4
17	Centre "		...	1	2	...	...	...	1	...	...	1	...	...	4	1	5	0·2	0·1	0·1	0·3
18	South "		...	...	1	1	2	...	1	...	1	3	2	...	8	3	11	0·5	0·2	0·3	0·2
19	East Ward	8	1	...	...	...	1	1	1	1	...	...	1	1	4	3	7	0·2	0·2	0·2	0·3
20	West "		...	...	...	1	1	...	1	...	...	1	1	..	1	3	4	0·09	0·3	0·2	0·4
	Total...	...	13	15	9	7	20	10	13	9	12	17	14	6	89	56	145	0·3	0·2	0·3	0·3

Annual Form No. XVII.—Deaths registered from *Other Causes* by Wards during each month of the year 1916.

1	2		3												4			5			6
Present Divisions.	Wards.	Corresponding Old Divisions.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. Males.	Total. Females.	Total. Total.	Ratio of deaths per 1,000 of Population. Males.	Ratio of deaths per 1,000 of Population. Females.	Ratio of deaths per 1,000 of Population. Total.	Mean ratio per 1,000 during previous five years.
1	East Ward ...	1	25	20	28	35	21	21	26	43	31	33	16	28	139	168	307	14·2	15·9	15·1	16·9
2	Centre " ...		73	50	66	66	42	47	47	49	51	59	65	62	377	300	677	18·5	14·8	16·7	20·8
3	West " ...		20	19	16	10	16	12	20	17	11	17	19	17	96	98	194	12·3	13·4	12·8	18·3
4	East Ward ...	2	28	13	21	13	22	15	15	17	18	14	13	21	109	101	210	12·7	16·8	14·5	15·3
5	Centre " ...		16	19	19	14	15	20	23	18	15	13	18	28	105	113	218	10·4	12·5	11·4	11·3
6	West " ...		28	32	23	33	26	20	25	28	28	19	31	31	164	160	324	13·6	15·3	14·4	13·1
7	North Ward ...	3	61	51	70	54	53	40	51	41	53	58	67	59	305	353	658	16·6	18·9	17·8	17·9
8	Centre " ...		42	49	35	43	32	24	34	37	38	39	21	45	214	225	439	14·4	16·4	15·4	16·4
9	South " ...		28	21	37	35	32	24	29	36	29	21	34	33	210	149	359	18·6	15·3	17·1	18·9
10	4th Division ...	4	42	32	40	31	32	33	35	32	37	28	38	36	226	190	416	17·2	16·0	16·6	10 9
11	North Ward ...	5	56	65	51	55	49	38	65	63	47	58	56	50	322	331	653	15 2	11·3	13·3	15·1
12	Centre " ...		27	37	29	42	34	23	34	36	51	34	41	31	193	226	419	12·7	15·5	14·0	14·0
13	South " ...		36	36	36	30	29	28	34	34	35	30	46	38	215	197	412	17·3	17·5	17·4	16·9
14	North Ward ...	6	10	18	7	13	15	11	11	12	18	9	12	10	70	71	141	11·3	12·8	12 0	12·9
15	South " ...		9	21	26	13	9	17	23	11	15	21	13	21	106	93	199	13·9	12·3	13·1	13·2
16	North Ward ...	7	47	49	32	42	50	34	45	44	32	33	43	35	232	254	486	17·0	19·3	18·2	17·3
17	Centre " ...		73	78	56	49	59	54	47	52	42	52	59	53	342	332	674	17·4	16·9	17·4	20·7
18	South " ...		72	54	51	44	54	29	38	45	49	39	42	56	286	287	573	17 1	17·8	17·4	18·8
19	East Ward ...	8	48	53	55	58	57	46	54	44	35	41	49	48	305	282	587	17·9	16·2	17·0	14·7
20	West " ...		30	17	29	26	30	20	23	29	26	33	17	20	154	146	300	14·6	15·1	14·8	14·4
	Total...	...	771	733	727	706	677	556	679	668	656	651	700	722	4,170	4,076	8,246	15·6	16·2	15·9	16·5

Annual Form No. XVIII.—Comparing the Deaths from some of the *Principal Diseases* during the year with the Death during the preceding four years.

Years.	Cholera.		Small-pox.		Measles.		Plague.		Malaria.		Enteric Fever.		Other Fevers.		Dysentery and Diarrhœa.		Tubercle excluding Tubercle of lung.		Respiratory System. Phthisis.		Respiratory System. Other diseases of the respiratory system.		Injury.		All other causes.		Total Deaths.	
	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,00C.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.	Deaths.	Ratio per 1,000.
1912	374	0·7	106	0·2	95	0·2	1	0·0002	2,934	5·7	42	0·08	957	1·8	4,897	9·4	453	0·9	219	0·4	1,999	3·9	164	0·3	7,891	15·2	20,132	38·8
1913	29	0·05	34	0·06	157	0·3	3	0·005	2,788	5·4	51	0·1	992	1·9	5,193	10·0	36	0·07	445	0·9	2,219	4·2	170	0·3	8,558	16·5	20,675	39·9
1914	1,757	3·4	66	0·1	87	0·2	2	0·004	2,658	5·1	66	0·1	720	1·4	5,508	10·6	35	0·07	703	1·4	3,024	5·8	149	0·3	9,399	18·1	24,174	46·6
1915	35	0·07	92	0·2	81	0·2	...	...	1,686	3·8	75	0·1	569	1·1	4,208	8·1	48	0·09	711	1·4	2,303	4·4	178	0·3	8,702	16·8	18,688	36·0
Mean of the last four years.	549	1·1	74	0·1	105	0·2	1	0·0002	2,516	4·9	58	0·1	809	1·6	4,951	9·5	143	0·3	519	1·0	2,386	4·6	165	0·3	8,637	16·7	20,917	40·3
1916	30	0·1	476	0·9	282	0·5	11	0·02	763	1·5	49	0·09	479	0·9	3,664	7·1	77	0·1	799	1·5	2,851	5·5	145	0·3	8,246	15·9	17,872	34·5

Annual Form No. XIX showing a Complete Classification of Diseases arranged in the order adopted in the Nomenclature of Diseases.

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Infective Diseases.	4	Beri-beri	1	4	...	...	...	...	...	...	...	...	...	...	5
	6	Chicken-pox	4	7	29	16	16	4	6	4	1	3	3	2	95
	7	Cholera	10	14	...	...	...	1	3	...	...	...	...	2	30
	10	Diphtheria	..	...	...	1	...	...	...	1	1	...	1	1	5
	11	Dysentery	191	195	183	145	125	110	105	154	115	101	108	137	1,669
	13	Enteric Fever	3	3	3	2	7	7	4	3	8	4	3	2	49
	14	Enteritis	161	153	187	121	177	155	178	208	160	138	129	185	1,902
	15	Erysipelas	3	...	1	...	2	...	...	1	2	1	1	...	11
	21	Influenza	...	...	...	...	...	...	...	...	...	1	...	...	1
	22	Kala-Azar	8	7	4	5	4	6	2	...	2	...	1	...	39
	23	Leprosy	8	10	7	8	9	12	10	11	7	10	13	5	110
	25	Malarial Fever	86	59	58	48	52	41	51	62	55	44	51	54	661
		" " with Enlargement of Spleen	13	4	11	6	3	6	8	7	6	4	4	9	81
		" " " Congestion of Brain	1	...	...	...	1	...	...	...	...	...	...	...	2
		" " and Dysentery	2	1	...	2	1	...	...	...	1	...	...	2	9
		" " (d) Cachexia	1	.....	2	1	...	3	...	...	2	1	...	...	10
	26	Measles	36	65	58	55	15	11	14	14	3	5	1	5	282
	28	Mumps	1	...	...	...	...	...	...	...	...	...	...	...	1
	31	Plague	...	...	...	...	...	...	...	...	2	3	1	5	11
	32	Pneumonia	42	61	64	52	51	50	64	62	43	40	49	55	633

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Infective Diseases—(contd).	34	Pyrexia of uncertain origin	51	57	59	63	27	27	33	38	38	27	23	36	479
	35	Hydrophobia	...	...	1	1	...	...	...	...	...	..	...	...	2
	37	Rheumatism	4	6	4	3	2	2	5	3	5	8	3	7	53
	39	Septicæmia	4	3	2	2	2	1	2	3	1	1	4	4	29
		„ Puerperal	5	2	1	4	5	3	4	2	1	3	2	1	33
		Septic Fever	7	1	1	4	3	2	1	3	3	1	...	...	26
		„ Peritonitis...	1	..	...	...	1	...	1	...	1	1	...	1	6
		„ Ankylosis...	...	1	...	...	2	1	...	...	...	...	...	1	5
	41	Small-pox	64	80	113	75	37	29	28	19	10	10	5	6	476
	42	Syphilis	5	8	4	8	2	1	3	3	2	4	5	2	47
	43	Tetanus	...	1	2	...	1	...	...	1	...	2	...	3	10
	44	Tubercle excluding tubercle of Lung	13	8	8	6	6	6	5	5	5	9	4	2	77
	47	Whooping Cough	15	3	5	11	13	2	6	4	6	4	1	3	73
General Diseases.	61	Anæmia	10	5	8	7	2	9	6	8	8	5	8	6	82
	63	„ Pernicious	...	1	1	.....	1	...	...	...	1	1	...	1	6
		„ and Dropsy	28	21	23	14	18	16	21	23	22	20	19	15	240
	66	Diabetes	2	3	3	5	6	4	2	3	3	8	2	2	43
		Diabetic Corbuncle	2	1	1	4	6	5	4	4	4	2	...	2	35
		„ Coma	1	1	...	1	2	1	...	...	...	...	1	1	8
		„ Gangrene	...	...	1	1	...	1	1	...	...	...	..	...	4
	76	Rickets	...	...	...	...	...	...	1	2	2	...	1	...	6

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Certain Morbid conditions Incident to various parts.	80	Tumour in the Abdomen	2	...	1	...	1	5	...	...	...	...	...	1	1[illegible]
		Sarcoma	...	...	...	...	1	...	...	...	2	...	...	...	1
		Cancer	4	1	3	3	1	1	1	1	2	2	5	3	27
		Ulcer	1	4	...	2	2	2	4	1	...	3	...	1	20
		Animal Poisons.													
		1 Venoms of:—(a) Snakebite	..	...	...	...	1	1	2	...	...	2	...	...	6
		DISEASES OF THE SPINAL CORD AND MEMBRANES.													
		Membranes.													
Diseases of the Nervous System.	88	Meningitis	2	3	2	2	1	3	...	2	3	2	2	5	27
		DISEASES OF THE BRAIN AND ITS MEMBRANES.													
		Brain.													
	101	Cerebral Hæmorrhage	3	8	2	1	4	...	2	2	...	1	5	5	33
	108	Hydrocepha'us	...	...	...	...	...	...	...	...	...	...	...	1	1
	109	Apoplexy	7	5	8	5	3	2	4	1	2	6	4	3	50
	110	Paralysis	9	8	9	11	8	6	9	9	8	13	15	13	118
		„ (a) Paraplegia , ...	15	...	8	6	3	2	1	2	1	...	...	...	38
		„ (b) Hemiplegia	18	19	17	15	16	10	9	8	9	8	9	20	158
	123	Eclampsia (Convulsions)	217	152	155	141	185	165	161	141	149	169	144	131	1910
		„ Puerperal	2	1	5	4	5	3	3	4	5	...	3	9	44
	124	Epilepsy	...	2	...	1	1	...	..	1	2	...	...	...	7
	131	Neuralgia	...	1	1	2	...	...	...	..	1	2	...	...	7
	133	Hysteria	1	...	...	...	...	1	1	2	...	...	...	1	6
	143	Neurasthenia	1	...	...	...	...	...	1	...	...	...	...	...	2
		II *Disorders of Function.*													
	145	Mania	...	...	...	1	...	...	...	...	...	...	...	1	2

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Diseases of the Circulatory System.		DISEASES OF THE HEART.													
		Diseases of the Pericardium.													
	286	Pericarditis	1	...	...	...	...	...	1	...	1	...	...	1	4
		Diseases of the Endocardium.													
	292	Endocarditis	...	1	2	...	...	...	...	1	...	...	...	1	5
	293	Valvular Disease...	3	8	5	1	3	6	6	6	6	8	7	8	67
		Cardiac Failure	22	27	15	28	16	17	11	10	17	16	27	30	231
		Cardiac Dropsy	4	7	6	8	3	4	4	9	10	11	12	8	86
		Diseases of the Heart (not specified)	21	27	29	13	14	15	16	16	9	9	12	17	198
		Disease of the Myocardium.													
	298	Dilatation of the Heart	...	...	1	1	...	..	...	1	1	...	...	2	6
	301	Cyanosis of the Heart	...	...	1	...	1	...	...	1	...	...	3	3	9
	304	Syncope	...	...	1	1	...	1	...	..	...	1	...	...	4
		Diseases of the Blood Vessels													
	316	Aneurysm of Aorta	...	...	...	...	1	...	...	...	...	...	1	...	2
	322	(1) Thrombosis of Arteries	...	...	1	...	..	...	...	...	...	1	...	1	3
		Diseases of the Veins.													
	325	Phlegmasia Dolens	...	1	..	...	...	...	1	...	...	...	...	...	2

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Diseases of the Respiratory System.		*Diseases of the Respiratory System not strictly Local.*													
	338	Asthma	15	9	14	9	10	10	4	4	6	13	9	8	111
		Diseases of the Trachea and Bronchi.													
	404	Bronchitis (acute)	22	29	36	30	32	20	20	14	15	22	24	15	279
		,, (chronic)	16	29	26	13	21	15	10	15	15	20	10	12	202
		,, (a) Catarrhal	1	...	...	...	...	...	...	...	...	1	...	5	7
		Diseases of the Lung.													
	410	Congestion of the Lung	...	1	1	...	1	...	...	2	...	...	...	1	6
	411	Hæmoptysis	1	...	...	...	...	...	...	1	...	...	...	...	2
	413	Broncho-Pneumonia	118	161	147	115	140	108	105	163	106	112	96	125	1,496
	419	Phthisis	80	69	78	66	56	49	50	78	60	72	65	76	799
	422	Atelectasis	2	1	1	3	...	3	..	...	2	1	5	..	18
	423	Collapse	2	...	...	...	...	...	1	2	1	...	...	...	6
		Diseases of the Pleura.													
	425	Pleurisy	...	3	...	1	3	...	2	2	2	2	...	1	16
	426	Empyema	1	1	...	...	...	...	...	...	...	..	...	...	2
Diseases of the Digestive System.		*Diseases of the Mouth*													
	436	Stomatitis	...	1	1	...	2	...	1	...	...	...	...	...	5
	438	Cancrum Oris	...	...	2	1	...	...	...	1	1	...	1	2	8
		Diseases of the Teeth, Alveoli, and Gums.													
	440	Disorders of Dentition Diarrhœa	3	2	11	5	8	5	4	3	5	2	4	6	58
		Diseases of the Palate and Fauces.													
	475	Tonsillitis	...	...	1	1	...	..	...	...	...	...	...	...	2

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Diseases of Digestive System—(contd.)		*Diseases of the Stomach.*													
	489	Gastritis Acute	3	4	2	1	2	1	1	1	2	1	3	1	22
		" Chronic	2	3	1	3	...	2	2	2	...	1	..	...	16
	490	Ulceration of Stomach	...	...	...	1	...	...	...	...		...	1	...	2
	499	Dyspepsia	8	12	9	12	7	7	13	7	12	10	7	11	115
		Diseases of the Intestines.													
	515	Inflamation—													
		(2) Appendicitis	...	2	...	...	...	...	...	...	1	...	..	1	4
		(3) Colitis	...	...	...	..	...	..	1	1	...	...	...	2	4
		" Gastro—Enteritis	6	9	4	3	6	5	2	1	6	7	4	2	55
	526	Sprue	..	2	...	...	...	...	...	1	1	...	...	...	4
	528	Hernia	3	4	2	3	...	1	3	3	4	4	3	7	37
		" Strangulated	1	2	1	1	3	2	1	1	2	1	2	1	18
	530	Intussusception	1	...	1	...	...	...	..	...	1	...	...	1	4
	536	Obstruction of Bowels	6	3	5	6	7	4	2	5	6	3	5	4	56
	539	Intestinal catarrh	3	5	3	2	4	2	3	2	4	2	3	2	35
	544	Colic	2	1	1	...	1	...	...	...	...	...	1	1	7
		Diseases of the Rectum and Anus.													
	550	Fistula of Anus	1	...	...	...	...	...	...	...	1	..	...	...	2
	556	Piles	...	1	...	...	1	1	...	1	...	1	...	...	5
	558	Stricture of the Rectum	1	...	...	...	...	1	...	...	...	...	...	...	2
Diseases of the Digestive System—(contd).		*Diseases of the Liver.*													
	568	Hepatitis	4	3	2	2	1	1	2	2	...	4	...	6	27
		(b) Cirrhosis of Liver	11	6	5	4	7	3	3	11	8	2	4	7	71
		Enlargement of Liver	2	1	1	3	3	1	...	...	1	1	3	4	20
	570	Acute Yellow Atrophy	...	...	..	..	1	...	...	...	...	...	...	...	1
	575	Jaundice	4	3	1	2	...	1	2	...	2	3	1	5	24
		Diseases of the Peritoneum.													
	588	Peritonitis	6	4	3	4	3	4	1	4	8	6	6	3	52
	590	Ascites	1	2	2	1	2	1	4	3	2	2	2	3	25
Diseases of the Lymphatic System.		*Diseases of the Spleen.*													
	592	Enlargement of the Spleen	...	...	...	1	1	1	...	1	2	3	...	...	9
		Diseases of the Lymphatic Glands.													
	615	Filariasis	2	...	...	...	...	1	...		...	1	...	1	5
	618	Elephantiasis of the Scrotum	2	4	2	...	...	1	1	2	1	1	1	2	17
		Elephantiasis of the Leg	2	1	...	1	1	1	3	3	3	1	...	...	16
Diseases of the Adrenals (Supra-Renals.		*Diseases of the Adrenals (Supra Renals).*													
	643	Hæmorrhage	6	2	2	5	8	2	3	4	11	3	4	...	45
Diseases of the Urinary System.		*Diseases of the Kidney.*													
	651	Nephritis Acute	5	4	4	3	2	1	1	4	1	3	2	3	33
		Renal Dropsy	4	5	9	3	6	2	5	7	7	6	8	7	69
	652	Bright's Disease	17	9	7	5	7	5	10	12	6	9	6	12	105

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Diseases of the Urinary System—(contd.)		*Sub-divisions.*													
		(1) Chronic Nephritis	...	...	...	...	...	...	1	...	...	...	1	...	2
		Diseases of the Kidney.													
		Diseases of Ureters.													
	674	Urinary Fistula	...	...	...	...	1	...	...	...	...	...	...	1	2
		Diseases of the Bladder.													
	676	Cystitis	...	1	..	1	...	...	...	...	1	...	...	1	4
	685	Rupture (Bladder)	...	...	...	1	...	...	...	...	...	...	...	...	1
	687	Stone in the Bladder	...	...	1	...	...	1	...	...	...	...	...	...	2
		Urinary Disorders.													
	692	Suppression of Urine	1	1	...	...	...	...	...	...	...	...	...	...	2
	697	Albuminuria	...	...	2	...	1	...	...	2	2	1	2	3	13
		Uræmia	...	...	..	...	...	...	...	1	1	...	1	2	5
		,, Coma	...	...	...	...	1	...	...	...	2	...	1	...	4
		DISEASES OF THE MALE OR ANS OF GENERATION.													
		Diseases of the Urethra.													
Diseases of the Generative System.	712	Stricture of Urethra	1	...	1	..	...	2	2	...	...	...	1	...	7
	715	Extravasation of Urine	...	...	...	...	1	...	...	1	1	...	2	...	5
		Diseases of the Prostate.													
	720	Hypertrophy	...	...	...	...	...	...	1	...	...	...	1	...	2
		Diseases of the Penis.													
	732	Ulcer of Penis	...	1	...		...	...	...	...	...	...	2	...	3

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Diseases of the Generative system.—(contd.).	741	Cellulitis Scrotum	...	1	1	4	1	1	...	2	...	1	1	2	14
	742	Sloughing Scrotum	...	...	1	...	...	...	...	...	...	1	...	...	2
		Diseases of the Tunica Vaginalis													
	754	Hydrocele	...	1	...	...	...	...	...	...	...	...	...	...	1
		Diseases of the Testicle.													
	757	Inflamation —(1) Orchitis	...	...	...	...	..	1	...	...	...	...	...	...	1
	762	Axial rotation	1	...	...	...	...	...	...	...	...	1	...	...	2
		DISEASES OF THE FEMALE ORGANS OF GENERATION.													
		Diseases of the uterine Ligaments, etc.													
	783	Inflamation (*b*) Pelvic cellulitis	...	...	...	1	...	...	...	...	...	...	...	...	1
		Diseases of the uterus including the cervix.													
	785	Metritis	...	1	...	...	...	...	1	...	...	...	...	...	2
	787	Ulcer (Uterus)	2	...	1	1	1	1	1	2	...	1	1	...	11
	797	Rupture of uterus	...	...	...	...	..	...	...	...	...	1	...	...	1
		Functional and Symtomatic Disorders of the Female Organs of Generation.													
	821	Men rrhagia	...	...	...	...	...	...	...	...	...	1	...	...	1
		Affections connected with Pregnancy.													
Affections connected with Pregnancy.	834	Abortion	1	...	1	4	1	1	1	1	2	...	...	1	13
		Affections connected with Parturition.													
Affections connected with Parturition.	852	Premature Birth	93	78	76	66	76	69	89	80	93	92	112	101	1025
		Difficult Labour	1	1	2	...	...	...	...	1	2	...	...	1	8

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Affections consequent on Parturition.													
Affections connected on Parturition.	853	Post-partum Hæmorrhage	1	2	...	1	1	...	...	3	...	1	1	2	12
	855	Puerperal Causes—													
		,, Sapræmia	1	1	...	...	...	2	...	1	...	...	...	1	6
		,, Tetanus	2	...	1	1	1	4	2	2	1	1	2	3	20
		,, Pyaemia	5	4	3	6	3	4	4	1	3	2	6	4	45
	870	Sudden death after delivery	1	...	2	1	...	1	3	1	...	1	1	1	12
		(*b*) Thrombosis of the cardiac	...	...	...	...	1	...	...	...	...	...	...	...	1
		Diseases of the connective Tissue.													
Diseases of the connective Tissue.	953	Abcess	4	12	8	10	8	6	10	7	6	5	5	3	84
		Diseases of the Skin.													
Diseases of the Skin.	962	Eczema	...	...	1	...	...	...	...	1	...	...	...	1	3
	965	Boil	1	...	...	1	...	1	...	...	...	...	1	...	4
	966	Carbuncle	1	4	2	8	4	...	2	4	1	1	3	2	32
	970	Herpes	...	1	3	...	...	2	4	1	1	...	...	1	13
	1001	B. Animal Parasites—													
		Scabies	2	...	...	1	...	...	...	...	...	...	...	...	3

	No. in the Nomenclature of Diseases.	CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		General Injuries.													
General Injuries.	1025	Effects of Heat (*a*) Burn and Scalds	5	4	1	...	1	1	2	1	2	1	4	...	22
	1030	Suffocation	10	6	12	13	5	7	8	8	6	9	4	8	98
		,, by Drowning, Accidental	3	2	2	4	10	5	2	3	5	4	8	4	52
		,, ,, Suicidal	1	...	1	...	1	1	1	...	3	5	...	1	14
		,, by Hanging	...	...	...	2	...	...	...	...	...	...	...	...	2
	1031	Starvation	...	...	1	...	...	...	...	...	1	...	...	1	3
	1033	Shock	1	2	1	2	5	5	2	...	1	2	3	1	25
		,, After Operation	5	...	2	...	3	...	1	...	1	...	...	...	12
		Local Injuries.													
	1092	Fracture of the Skull	...	...	2	...	...	1	3	3	2	1	...	...	12
	1096	Concussion of Brain	...	1	...	1	...	...	...	...	...	2	...	3	7
		Injuries of the Chest.													
Local Injuries.	1156	Multiple Injury	4	2	2	1	1	2	1	1	2	3	4	4	27
		Injuries of the Back (including the whole Vertebral Column).													
	1160	Fracture of Spine	1	...	...	...	...	...	...	...	1	...	...	...	2
	1162	Compound Fracture	1	1	1	1	...	1	1	...	1	...	1	2	10
		Ill defined and non-specified causes.													
		Debility	64	138	134	165	118	52	161	154	104	101	143	141	1475
		Old age	42	36	37	25	31	32	21	27	38	31	24	27	371
		Natural causes	1	1	...	...	1	...	...	1	...	...	1	1	6
		Unknown	1	...	...	1	...	...	1	...	...	1	...	...	4

HEALTH DEPARTMENT—SANITARY SECTION.

Statement of Notices issued and disposed of during the year 1916.

(a) Total Number of premises in the City according to the Census of 1911 = 59,595.
(b) Number of premises inspected during the year 1916 = 5,798.

1	2	3	4	5	6 No. complied with			7	8
Section or By-law.	Substance of Section or By-law.	No. pending on 1-1-1916.	No. issued during the year 1916.	Total.	Voluntarily.	By prosecution.	No. disposed of by transfer to W. D. for departmental execution and recovery of cost.	No. cancelled or withdrawn.	No. pending on 31-12-1916.
218	Constructing and connecting a house drain with a public drain	4	46	50	6	1	1	31	11
221	Maintenance of troughs and pipes for catching and carrying the water from the roof and other parts of a building	5	51	56	42	2	...	2	10
224	Provision of latrines by owner or occupier	105	263	368	130	59	...	80	99
227	Control of the Corporation over house drains, privies and cesspools	29	122	151	70	...	...	5	76
239	Fencing of buildings or land	...	...	...	...	...	...	...	...
245	Levelling, paving, metalling, flagging, etc., of any private street or part thereof ...	...	7	7	...	...	...	7	...
259	Repair of tanks, wells, etc., dangerous to neighbourhood	...	...	...	...	...	...	...	...
293	Provision of receptacles for storing rubbish	23		23	...	...	...	23	...
300	Prohibition against accumulation of filth and allowing of sewage to flow in streets	1	203	204	173	13	...	3	15
301	Cleansing of insanitary private tanks or wells used for drinking	...	...	...	...	...	...	...	...
302	Do. fencing, repairing or filling up of insanitary tanks, wells, etc. ...	67	107	174	64	41	2	35	32
303	Do. stagnant pool, ditch, etc.	38	56	94	42	18	3	13	18
305	Do. of untenanted buildings or lands	9	84	93	40	14	...	29	10
306	Removal of filth or noxious vegetation	44	290	334	276	23	...	22	13
307	Limewashing and cleansing of buildings	209	735	944	683	111	...	80	70
308	To set right insanitary buildings	1,114	3,586	4,700	2,176	1,152	1	383	988
309	Rendering buildings fit for human habitation	347	199	546	148	84	...	224	90
310	Abatement of overcrowding in dwelling houses or places	...	...	..	...	...	...	...	...
315	Control over stables, cattle sheds and cow houses	95	159	254	43	1	...	78	132
316	Discontinuance of the use of a building as a stable, etc.	123	68	191	24	5	...	146	16
366	Removal of patients suffering from dangerous diseases to hospitals	1	48	49	30	3	...	16	...
367	Disinfection of buildings and articles in infected premises	3	429	432	424	5	2	...	1
217	By-laws for the regulation of lodging houses	14	...	14	...	...	...	...	14
	Total ...	2 231	6,453	8,684	4,371	1,532	9	1,177	1,595

List of Inspections by the Food Inspector, North Range, during the year 1916.

1	Royapuram Goods Shed	138
2	South Indian Railway Goods Shed	205
3	Salt Cotaurs Goods Shed	37
4	Spring Haven Shed, (Export and Import Sheds)	247
5	Aerated Water Factories	142
6	Grain Godowns, North Beach Road	175
7	Do Wall Tax Road	83
8	Do Krishnan Covil Street and Kotwal Market	144
9	Fruit Godowns	264
10	Auction Rooms	187
11	Tin Food Shops	114
12	Bake Houses	178
13	Onion Godowns	182
14	Potatoe do	204
15	Salt Fish do	95
16	Markets	507
17	Sweet Meat Bazaars	235
18	Customs House	52
19	Wheat Flour Godowns	126
20	Coffee Hotels, Lodging Houses and Eating Houses	921
21	Sugar Candy Factories	37
22	Dairies	42

List of articles destroyed during 1916 *by the Food Inspector, North Range.*

1	Condensed Milk	lbs.	15,009
2	Chocolate	do	104
3	Cocoa	do	13
4	Coffee	do	926
5	Glaxo	do	2
6	Oats and Arrowroot	do	30
7	Biscuits	do	1,230
8	Jam	do	1,867
9	Cheese	do	1,961
10	Fruits preserved	do	14
11	Butter	do	492
12	Ham	do	104
13	Confectionery	do	350
14	Brandy	Qrt.	1
15	O. T. Drink	do	1
16	Topieco Rice	lbs.	4
17	Barley and Oatmeal	do	20
18	Quakeroats	do	196
19	Sardines	do	157
20	Dog Biscuits	do	10
21	Grape Nuts 13 cases 48 lbs. each	do	624
22	Force Food 5 cases 48 lbs. each	do	240
23	Meat	do	913
24	Meat Cooked	do	245
25	Salt fish	do	75

List of articles destroyed during 1916 *by the Food Inspector, North Range*—(Continued).

26	Fish	Baskets	184
27	Potatoes	Bags	21
28	Onions	do	185+
	Do	and Boxcart loads	11
29	Tamarind	Maunds.	1,109
30	Turmeric	Bags	3
31	Eggs	No.	170
32	Rice Cakes	No.	375
33	Breads	No.	4
34	Beefs	lbs.	152
35	Tea	do	155
36	Beetle nuts	Bag	1
37	Scented Beetle-nuts	lbs.	40
38	Molasses	Baskets	30
39	Broken Rice	Bags	611
40	Bengal Gram Toor, Beans, etc.	Bags	25
41	Trash	Visses	48½
42	Gudauk	lbs.	15
43	Scented Tobacco	do	43
43*a*	Sugar	Bag	1
44	Mangoes	Baskets	214¼
45	Oranges	do	129
46	Plantains	No.	1,575
47	Pomagranates	do	226
48	Apples	Baskets	2
49	Custard Apples...	do	326+
		1 Motor load and 8 Boxcart loads.	
50	Melons	No.	2,481
51	Country Apples...	Baskets	10
52	Grapes	Visses	7
53	Jack Fruits	No.	33
54	Pine Apples	do	7
55	Guava Fruits	do	74
56	Pumpkins	do	49
57	Wood Apples	Baskets	3
58	Figs	do	6
59	Plumes	Visses	2
60	Tomotoes	No.	55
61	Vegetables	Bags	5½
62	Cocoanuts	Nos.	1,875
63	Aerated Waters	{ do Bottles emptied out. }	61

Statement showing the places inspected and the number of inspections made by the Food Inspector, South Range, from January to May 1916.

No.	Description of Inspection.	No. of Inspections made.
1	Markets	494
2	Bakeries	311
3	Dairies	54
4	Tea-clubs	474
5	Coffee-clubs and Restaurants	546
6	Sweetmeat bazaars	1156
7	Bazaars and Shops	1161
8	Ærated-water Factories	119
9	Do. do. Carts	31
10	Curry Stalls and Eating Houses	241
11	Goods-Sheds	27
12	Stores and Godowns	343

List of articles destroyed by the Food Inspector, South Range, from January to May 1916 and by Sanitary Inspectors of the South Range during the year.

No.	Name of Food Stuff.	Quantity destroyed.
1	Mangoes	12 baskets and 1429 Nos.
2	Plantains	784 Nos.
3	Jack Fruits	$2\frac{1}{4}$ baskets and 4 Nos.
4	Oranges	932 Nos.
5	Guavas	55 ,,
6	Melons	67 ,,
7	Potatoes	16 visses.
8	Tomatoes	363 Nos.
9	Limes	44 ,,
10	Beans	$\frac{1}{2}$ viss.
11	Beef	22 lbs.
12	Fish	9 lbs., 5 basketful and 20 Nos.
13	Eggs	26 Nos.
14	Onions	1 bag, 2 baskets, 7 mds. and $7\frac{1}{2}$ visses.
15	Cocoanuts	1 basket and 188 Nos.
16	Prawns	4 baskets, 3 trays and 2 Nos.
17	Liver	2 bits and 9 Nos.
18	Lungs	3 bunches and 6 Nos.
19	Stomach	1 No.
20	Intestines	7 Nos.
21	Undays	357 ,,
22	Custard Apples	283 ,,
23	Poppies	2 visses.
24	Cheese	1 case.
25	Tamarind	3 visses.
26	Bread	61.
27	Vadays	851.
28	Rice Cakes	12.
29	Vadais and Murukku	1 trayful.
30	Cooked Curry	18 plates and 14 chatties.
31	Polavu	1 plate.
32	Cutlet (Potatoes)	34 plates.

List of articles destroyed by the Food Inspector South Range, from January to May 1916 and by Sanitary Inspectors of the South Range during the year—(*Continued*).

No.	Name of Food Stuff.	Quantity destroyed.
33	Pineapples	8 Nos.
34	Apples	77 „
35	Pigs	4 „
36	Pork	1 basketful.
37	Sorakka	1 plateful.
38	Boiled Eggs	7 Nos.
39	English Sweets	6 lbs.
40	Pomegranates	15 Nos.
41	Butter	10 tins.
42	Mutton	6 legs and 13½ lbs.
43	Aerated Water Bottles ...	129 bottles emptied out.
44	Cow	1 carcase.
45	Brandy	1 bottle emptied out.
46	Condensed Milk	36 doz. tins.
47	Tinned peas	8 doz.
48	Halva	6¼ lbs.

CORPORATION OF MADRAS.

PART II.

Special Malaria Department.

I continued to hold the office of Special Malaria Officer throughout the year under report.

There was a further reduction in the establishment during the year, leaving a bare minimum of hands with which to carry on the routine work in a steady and continuous manner. Only one Malaria Supervisor assisted by two foremen was employed and he was in subordinate charge of the out-door anti-malarial work in the city.

Investigation.

Mosquito Survey: Malarial zones.

The mosquito survey of the following parts of Madras, *viz.*, Royapuram, Tondiarpet, Washermanpet, Royapettah, Mylapore and Purasawakam which were known to have suffered from Malaria was completed before the commencement of the calender year. Nothing more was left for us to do in this direction during the year under report. Our duty consisted mostly in maintaining an attitude of preparedness. The causes of Malaria and the chief Malaria-carrying-anophiline-mosquitoes of Madras are now known and have been reported upon in previous reports, and our campaign was therefore naturally directed against these known enemies and their known strong-holds. Acting on information received from several quarters we were generally successful in our efforts to rid the locality of the nuisance complained of.

The Cooum River and the Buckingham Canal.

The Cooum River and Buckingham Canal required a good deal of attention during this year—petrolising, clearing the edges of moss and other vegetation and so on. Several complaints were received from Captain Russell, I. M. S., and Major Ross, I. M. S., regarding the mosquito nuisance in the General Hospital and it was always found that the chief source of nuisance was the Cooum River. It was this river again that caused further nuisance in its course near Commander-in-Chief's Bridge. Several complaints were received from the residents in Mount Road, more particularly from residents in and around the Madras Club.

Village of Perambur.

A complaint having been received from the residents in Perambur that there was a great incidence of fevers in that locality. A search was made for breeding places of Anophiline Mosquitoes. The village of Perambur, it will be noted, is riddled all over with Railway burrow-pits and ponds in addition to the extensive marshy tracts of paddy fields. Samples of mosquito larvæ were collected in the neighbourhood of the village and on breeding in the laboratory they hatched out into Anophiline Culicifacies and An. Barbirostris. 29 children were examined in Perambur Paracheri for enlarged spleen, but only two were found to have small palpable spleens. Of 29 blood smears examined, Parasites were found in only two of them.

The above was duly reported in my quarterly report ending with September 1916 upon which the Malaria Board made the following remarks :—

"The attention of the Railway Authorities may be drawn to the numerous burrow-pits in Perambur and they may be advised to fill them or drain them in their own interest. Ponds in the same area should also be filled in without delay."

In their order No. 141-M. of 26th January 1917, the Government observed that "Orders will issue in the Public Works Department on the recommendations of the Malaria Board in regard to the Railway burrow-pits in Perambur."

Mosquitoes and Wet Fields.

In parts of Mylapore, Nungumbaukam and Perambur there are a number of low-lying lands used for purposes of cultivating paddy. The cultivation season is during the winter months corresponding to the period of the south-west monsoon. These shallow and extensive low-lying places will allow stagnation of water to a height of from 18 inches to 2 feet and form prolific breeding grounds for Anophiline mosquitoes. In Nungumbaukam and on the outskirts of Perambur and Vyasarpady such fields are in existence practically continuously throughout the year ; in Mylapore such low-lying plots are for the greater part of the year dry, as cultivation is carried on to grow one crop and that, during the monsoon season only between September and January. Persons going along Royapettah High Road towards Mylapore must be very familiar with such conditions.

Some of these were searched for Anophiline mosquito larvæ and we were able to get fairly large samples at each examination. The larvæ were found breeding into one or other of the following varieties : Anophiline Rossii, Anophiline Fowleri, Anophiline Listoni—the first two varieties predominating to a very great extent. The following table shows the number of places examined :—

TABLE 1.

Division No.	Block No.	Varieties of Anophiline mosquitœs found breeding.	Date.
14	9	Culicifacis and Rossii	15-11-1916
19	11	Culicifacies, Listoni and Rossii	27-11-1916
19	23	Listoni and Rossii	27-11-1916
13	28 shallow pits in the bed of Spur tank.	Neocella Fowlari and Rossii ...	29-11-1916
11	49	Neocella Fowleri and Rossii	30-11-1916
13	39	Culicifacies and Rossii	2-12-1916
19	15	Rossii	7-12-1916
19	33	Rossii	7-12-1916
20	34	Rossii	7-12-1916

Viewed from the stand-point of Malarial prophylaxis and in the best interests of the City, wet cultivation is highly undesirable within the Municipal limits and over a radius of at least half a mile from the outskirts of the City. There are several other areas in Madras that require treatment whether by drainage, by filling or by a combination of both methods. The most important of these are (1) the marshy tracts in and around Korukupet and Washermanpet. (2) the several Railway burrow-pits along the M & S. M. Railway line between Washermanpet Railway

Station and Perambur Railway Station. (3) the deep triangular hollow bounded by the three M & S. M. Railway lines, one running from Vysarapady to Washermanpet, another from Washermanpet to Basin Bridge and a third from Basin Bridge to Korukupet. (4) the land to the west of the Office of the Inspector-General of Police and close to the Buckingham Canal. As regards the draining the marshy tract in Egmore between the Office of the Commissioner of Police and the Record Office, the matter is still under correspondence between the Public Works Department and the Corporation.

Malaria Survey : Random Sampling. The following table gives spleen rate and parasite rate found in several selected parts of the City :—

TABLE 2.

Division.	Place.	No. examined for enlarged spleen.	No. with enlarged spleen.	Per cent.	Per cent. 1915.	No. of blood smears taken.	No. infected.	Per cent.	Per cent. 1915.
1	Kasi Modu Kuppam ...	34	5	14·7	13·2	34	4	11·8	5·3
1	Palm Kuppam ...	20	2	10·0	11·4	20	2	10·0	8·6
2	New Washermanpet ...	40	14	35·0	...	40	3	7·5	...
3	Korukupet Paracheri ...	32	13	40·6	...	32	2	6·2	...
3	Basin Bridge Paracheri ...	34	16	47·1	...	34	7	20·6	...
10	Perambur Paracheri ...	29	2	6·9	...	29	2	6·9	...
10	Kandappa Pillai Street ...	17	1	5·9	...	17	...	...	...
11	Graman Paracheri ...	40	6	15·0	17·0	40	4	10·0	20·0
11	Graems Paracheri ...	40	3	7·5	5·0	40	2	5·0	2·5
11	Vettiyan Paracheri ...	21	3	14·3	13·6	21	1	4·8	4·5
11	Ponnan Paracheri ...	29	2	6·9	13·2	29	2	6·9	11·1
11	Otary Obrapalayam ...	42	3	7·1	10·2	24	3	7·1	6·7
16	Cox Paracheri ...	42	2	4·76	...	42	2	4·76	...
18	Parthasarathy Kuppam ...	36	2	5·6	...	36	...	...	...
19	Teynampet School ...	66	41	62 1	...	66	5	7·6	...
19	„ Damodaram School.	133	67	50·4	...	133	9	6·8	...
19	Krishnampet Free School ...	130	38	29·23	...	130	3	2·3	...
19	Mirsapet ...	28	3	10·7	...	28	2	7·1	...
20	Tiruvalluvur School, Ellapada Mada Coil Street, Mylapore ...	66	29	43·93	...	66	2	3·03	...
	Kodambakam H.P.B. school.	60	4	4·6	...	60	1	1.7	...
	Total ...	939	256	28·32	...	939	56	5·96	...

In the following table the figures are re-arranged so as to group them under Municipal divisions :—

TABLE 3.

Division.	No. examined for enlarged spleen.	No. with enlarged spleen.	Per cent.	Per cent. 1915.	No. of blood smears taken.	No. infected.	Per cent.	Per cent. 1915.
Tondiarpet ...	160	50	31·25	21·64	160	18	11·25	1·44
Perambur ...	46	3	6·52	...	46	2	4·34	...
Purasawakam ...	172	17	9·88	37·0	172	12	6·97	6·54
Chintadripet ...	42	2	4·76	...	42	2	4·76	...
Triplicane ...	36	2	5·6	...	36	...	...	...
Mylapore ...	483	182	37·68	...	483	22	4·56	...
Total ...	939	256	28·32	...	939	56	5·96	...

Dispensary Statistics.

A good deal of attention is naturally paid to these returns ; for they afford a fairly reliable index for any rise in Malaria fevers in the localities served by these dispensaries. Blood smears are obtained from patients suffering from fever resorting to the Malaria dispensaries of the Corporation for treatment and the table given below shows the percentage of smears found infected.

Compared with the figures obtained during the year 1915, it is observed that a notable decrease in hospital admissions for malarial fevers in Purasawakam, Royapuram and Washermanpet. Dhobipet shows an apparent increase ; but the conditions here are peculiar as a number of patients from Tangal and other places outside the Toll-gate in Tiruvottiyoor High Road repair here for treatment. If these cases are excluded, it is found that marked improvement is observable almost everywhere.

TABLE 4.

Dispensary.	Total Number of slides examined.	Number infected.	Per cent.	Per cent. for 1915.
1st Dispensary, Dhobipet	208	47	22·6	12·5
2nd do Washermanpet ...	43	12	27·9	31·3
3rd do Royapuram ...	427	119	27·9	40·3
4th do Purasawakam ...	688	191	27·8	50·0
Total ...	1,366	369	27·01	43·2

Anti-Malarial Measures

The usual preventive operations undertaken by the Department are as follows :—

(1) Cleaning of ponds, tanks and ditches.
(2) Petrolising.
(3) Clearing rank vegetation.
(4) Introduction of larvicides (fish and ducks).
(5) Quininisation.
(6) Reclamation.
(7) Drainage.

Of the above measures, drainage and reclamation are classed as "measures of permanent utility," inasmuch as the further breeding of mosquito larvæ is thereafter entirely stopped from lack of suitable breeding grounds in the localities so drained or reclaimed. But then, these radical measures take time to do, cost a good deal of money and are not therefore within the range of routine anti-malarial operations. We are, therefore, obliged to resort to palliative measures, *i.e.*, measures of temporary utility, requiring intermittent or constant care. In this group come the first five measures mentioned above. Regarding the particular method which may be suitable to a particular case, each case has to be judged on its own merits ; but this selection becomes comparatively easy when once the staff gets to know the nature of the work.

Cleaning of Tanks and Ponds.

Tanks and ponds are cleaned at the expense of the Corporation. This cleaning is done in the well-known malarial zones, *viz.*, Tondiarpet (1st, 2nd and 3rd Divisions), Purasawakam (11th Division) and Mylapore (19th Division) and also in other neighbouring divisions. Several tanks have had to be cleaned from four to seven times during the year under review. Table 5 shows the total number of tanks cleaned in the several divisions noted against each.

TABLE 5.

Georgetown	2
Tondiarpet	299
Vepery	10
Purasawakam	39
Perambur	54
Mylapore	42
Egmore	5
Nungumbaukam	4
Triplicane	7
Total ...	462

The one great desideratum is a special Supervisor to see that each tank is cleaned thoroughly and well of all weeds and Aquatic plants, and also that all overhanging branches of trees are trimmed so as to prevent the falling of leaves and twigs. Again, we must be on the look out to find out which of these tanks require re-cleaning so that the work can be promptly done and at minimum cost. For, unless the re-cleaning is undertaken in time, weeds and other Aquatic plants grow so rapidly that a tank may soon be practically in the same condition as in the pre-cleaning days. A timely recleaning takes about one

fourth of the time of the first cleaning, and if regularly performed, a third and fourth cleaning take still less time.

In some tanks in Tondiarpet, the water is several feet deep and weeds are found growing from a depth of nearly 10 to 15 feet under the water. The men engaged for tank-cleaning cannot remove them by their roots. We have tried rakes with long ropes, but these are not found of much use in such cases. The underlying growth starts up so rapidly, especially during the winter months, that a re-cleaning is required.

In some cases a peculiar kind of scum of sand-like appearance collects and covers the surface of the water. This is called "Clathrocystis" and can be seen at any time in some of the temple tanks in Madras. This vegetation is so fine that it is hard to remove it entirely even by an ordinary cloth, serving as a sievelike arrangement.

A few tanks in People's Park, Robinson Park, etc., are cleared of twigs, leaves, etc., once a month to give them a clean and nice appearance.

A tank near Kandaswamy Kovil in Purasawakam was cleaned on 2nd February 1917 and in six weeks it was so dirty that it required re-cleaning.

Petrolising.

In the early days of our anti-malarial measures a good deal of petrolising work had to be carried out notwithstanding the fact that it was only a measure of temporary utility; for, reclamation meant time and even the cleaning of a tank where dangerous Anophiline Mosquito larvæ were found breeding in plenty took some time, during which interval the larvæ may hatch out into dangerous mosquitoes and spread fevers in the neighbourhood; in these cases petrolising is of undebated value as a prompt prophylactic measure. As, in course of time, several of these dangerous places were filled up while others were cleaned and recleaned periodically, the scope for this anti-malarial measure became limited, and the heavy cost incurred for materials required and labour maintained for the work have been now reduced to a minimum. Moreover this measure has got distinct limitations of its own. Firstly, it is a measure of temporary utility; secondly, in the case of extensive tanks and ponds it is a measure difficult of satisfactory application. For the winds carry away the oil to one side or other and it is difficult to ensure that the whole surface and not merely a part is covered with oil. But in cases of drains, cess-pools, etc., where flourish the larvae of only Anophiline Rossii and Culex mosquitoes (neither of these are malaria carriers) petrolising is of undoubted value in preventing the nuisance from the mosquito pest.

"When extended upon the surface of water it gives off no products which can contaminate the subjacent liquid by diffusion. It suffocates mosquito larvæ mechanically, by preventing them from taking in air at the surface. It has no effect upon fishes or other animals which breathe by means of fills, provided that the water contains enough vegetation to furnish the requisite oxygen."

The small pools and puddles that are formed in large numbers soon after the monsoon are dangerous though temporary breeding grounds. As it is impracticable at present to prevent the formation of such temporary breeding grounds, the only remedy lies in keeping them free from mosquito larvæ. Some of the more prominent localities where such pools and puddles are formed are the following:—

(1) Government House compound.
(2) Otary Nullah.
(3) Spur Tank.

(4) Madavakam Tank.
(5) Low marshes in Perambur.
(6) Bed of the Buckingham Canal.
(7) Bed of the River Cooum.

Table 6 shows the number of tanks, pits, pools, ditches, etc, that were petrolised in the several divisions :—

TABLE 6.

Place.	Tank.	Ponds, pits and cess-pools.	Low-marshes.	Wells.
1. Tondiarpet ...	504	1,057	...	...
2. Purasawakam ...	130	800	...	...
3. Mylapore ...	163	910	12	6

In addition to those shown above, the following were regularly petrolised once every week :—

1. Selected areas along the water edges of the Buckingham Canal and Cooum River, *e.g.* Portions of the Buckingham Canal between Elephant Gate and College Bridge, Triplicane and Mylapore, Cooum River on either side of the Commander-in-Chief's Bridge behind the Government House.
2. Portions of Teynampet Canal.
3. Chematha Lake.
4. Tanks in Government House compound.
5. Otary Nullah.
6. Spur Tank, Madavakam Tank and Marshes in Perambur.

While petrolising was found necessary in cases where water was found unused and stagnating, it was seldom required in the case of ponds and wells which were in consant use. Here cleaning seems to ensure greater success as an anti-malarial measure. Petrolising in such cases is disliked because of its supposed deleterious effect on vegetable growth, and because the oily scum renders the water unfit for human consumption.

Cleaning of rank vegetation.

This is more in the nature of a general sanitary measure intended to remove the resting places of the mosquito before it is able to get access to human dwellings. Table 7 shows details of work done in this direction in some parts of Madras.

Table 7.

Tondiarpet	...	...	...	65,23,750 sq. ft. of ground.
Vepery	...	...	...	3,68,000 „ „
Mylapore	...	...	...	3,51,000 „ „

In addition, extensive plots of ground were cleared, during the year under review, of rank vegetation such as wild croton, howtharn and especially prickly-pear which is

found growing wildly around the paracheries in Korukupet, Purasawakam and Perambur. The prickly-pear eradication is still being continued in several parts of the City.

Table 8 shows details of tanks, channels etc. cleaned of Water Hyacinth.

TABLE 8.

Block No.	Tank No.	R. S. No.	Date when started.	Date when finished.	Area of tank.
			Purasawakam Division.		
46	Otary Nullah	...	10-1-1916	11-1-1916	600″ × 54″
			Vepery Division.		
40 B	2	1791	11-3-1916	14-3-1916	150″ × 128″
”	3	1796	14-3-1916	16-3-1916	136′ × 100″
”	4	1796	16-3-1916	17-3-1916	75″ × 53″
”	5	1796	17-3-1916	23-3-1916	178″ × 115″
			Perambur Division.		
”	2	219	7-3-1916	8-3-1916	98″ × 85″
”	3	219	9-3-1916	10-3-1916	143″ × 106″
”	4	218	28-2-1916	28-2-1916	136″ × 118″
”	5	218	29-2-1916	7-3-1916	125″ × 105″
17	Low marsh	290	10-3-1916	10-3-1916	170″ × 130″
3 A	1	115	11-3-1916	13-3-1916	143″ × 136′
			Mylapore Division.		
40	1	69	...	...	150″ × 80″
			Nungumbaukam Division.		
4	1	27	...	...	200″ × 100″
			Egmore Division.		
26	Low-land	4512	...	...	120″ × 660″

The growth of this wild vegetation is becoming so increasingly abundant in Otary Nullah, in pools and puddles formed in the bed of the Spur tank and in some channels and ponds in Perambur, that it is time that some permanent measures are taken to see that the threatened menace does not assume unmanageable proportions. In this connection a proposal of one of my predecessors, Major Hodgson, I.M.S. is very suggestive and well worthy of adoption. (*Vide* his report of 1914). " It will be necessary that some permanent fund be put aside yearly to keep these tanks clean. And I propose suggesting that it should be necessary for the owner of a tank to have a license to keep the tank, otherwise he must be compelled to fill it up, and the fee for this license should be sufficient to pay for the cleaning of the tank periodically at the expense of the Corporation. It is perfectly impossible to expect private owners to keep their tanks clean. They have neither implements nor the trained staff to keep them clean even if they were cleaned in the first instance by the Corporation. Also it will be far more expensive for the private owners to keep a gang to clean them than that the Corporation should undertake the work for them. If it is insisted that private owners are to keep their tanks clean, it will mean a large staff

for inspecting these tanks and a very large number of cases in court every year. That is to say the maximum amount of discomfort and the minimum amount of efficiency."

Larvicides. Fish may be introduced into any reputed mosquito breeding tank, pond or well, but it does not necessarily follow that the breeding grounds are thereby rendered innocuous; for this antimalarial measure is hedged round with many limitations, and failure may result from varied causes. It may be that the pond is so weedy that the fish cannot get at their prey, the mosquito larvae being sheltered amidst the leaves; or it may be that the particular kind of fish is unsuited to the particular spot and so fails to thrive. It may be that the spot selected for fish introduction is unsuited for fish life generally or it may be that the tiny larvicidal fish are put into a water, where there are already some big fish or such other natural enemy of the small fish. Big fish are not usually larvicidal.

Provided sufficient attention is paid to all such factors as those mentioned above, certain varieties of fish such as Haplochilus Panchax (Kulla Kudai) Haplochilus Melanostigma (Munde Kannu) and Chela Argentia (Vellache Kandee) do undoubtedly act as efficient larvicides. But to carry on this measure with any success, a constant supervision must be maintained and a fresh supply of fish must be introduced to such of those places which are rendered fishless. During the years 1914 and 1915, however, all the wells in the notoriously malarious parts of Madras and several wells in other parts were stocked with fish and up to the end of May 1915, over 11,000 wells had been treated in this manner. Subsequently these wells were re-surveyed (1) to mark the wells that were rendered fishless and (2) to discover if the wells, where fish were alive, were rendered innocuous. The results of this re-survey are given in Table 9 on page 124 and as compared with the figures for 1915, the results appear rather dissappointing. In referring to this subject in my report for 1915, I concluded from the data then available (1) that, in a large proportion of wells the fish introduced continued to breed and live, (2) that mosquito larvae were found in very few of such wells and (3) that, wherever mosquito larvae were found, there it was almost invariably the case that fish had died. After further experience with these fish I doubt whether they are as useful under natural environments as under somewhat artificial conditions. Fish are not of much use as enemies of mosquito life if the water surface is covered with plenty of weeds, leaves and twigs; for then, they cannot get access to the little mosquito larvae which find a safe shelter underneath the floating material of this description. But if these floating substances are removed the edges of the tank or pond cleaned, and the overhanging branches of trees cut, so that the water surface is exposed to the action of the wind and sun, then conditions are in themselves inimical to mosquito life, and thus it is difficult for us to judge the exact role of fish as larvicidal agents. But it is seldom if at all such ideal conditions exist for any length of time. What usually happens is, that, very soon after cleaning, the surface begins to get covered with leaves and other debris, and moss or other vegetation begin to grow along the edges, with the result that mosquito larvae breed readily under such hospitable shelter. It therefore comes to this, that, fish or no fish, mosquito larvae thrive in a tank or pond which is not kept cleaned and recleaned; and if it is kept so cleaned and recleaned, mosquito larvae do not thrive, fish or no fish. This does not mean that fish do not, to some extent at least, act as larvicidal agents in the intervals between the cleanings; weeds take time to grow and the entire surface of water is not covered over with leaves, weeds, moss etc., in a day, and fish will surely act whenever and wherever they can get at the larvae. In other words, whatever may be its value as an independent measure, it cannot be denied that the introduction of fish, as auxiliary to other

methods of work such as cleaning and recleaning has a distinct place in our scheme of anti-malarial operations.

Re-survey of wells.

Domestic and garden wells in George Town, Vepery and Purasawakam where larvicidal fish were introduced in 1914-15 were re-surveyed to find out (1) whether fish were living in them and (2) if so, whether the fish exerted any inimical influence on the life of mosquito larvae.

TABLE 9.

Place.	Number of wells examined.	Number of wells in which fish were dead.	Number of wells in which larvae were found.
1. George Town	2,297	258 ; 1·4 p. c.	322 ; 14·3 p. c.
2. Purasawakkam ...	722	173 ; 23·9 p. c.	167 ; 23·1 p. c.
3. Vepery	273	49 ; 17·9 p. c.	62 ; 22·7 p. c.

Prior to the introduction of fish into wells Larvae of Anophilene Stephensii were found breeding in 75 *per cent.* of the wells in the City. The fish have been of great use in keeping down this source of malarial infection. But under the existing condition of wells in the several parts of the City, this measure is not likely to assure permanent success, unless they are repeatedly examined and fish introduced wherever they are absent. In several parts of the city the well is situated quite inside the house, within the Kudam or very near the kitchen and is only 3 or 4 feet in diameter; Being covered over by the roof of the house, there is practically no chance of the well being exposed to broad day light or direct rays of the sun, and therefore not properly aerated. In some instances the well is not used for domestic purposes, while in a few cases all kinds of fifth are thrown into it, converting it into a veritable cess-pool.

It is for these reasons that a survey of wells where fish were let in on a previous occasion has to be continuously carried on month after month to see that the wells are not rendered fishless. In cases where this anti-larval measure is tried and found useless, the well is either hermetically sealed over or filled up entirely.

Ducks as larvicides.

Ducks were allowed to remain in the pond all day long and taken out at night-fall and reintroduced next morning. A watchman was specially engaged to look after this work and I visited the spot every third or fouth day to study what effect the presence of ducks had on the extent of mosquito larvæ present. The experiment was conducted on three occasions at intervals of over three weeks and on no occasion was any satisfactory result obtained, the mosquito larvae thriving as merrily as before the introduction of ducks.

There is one underlying fallacy in these experiments which is sometimes apt to be overlooked. This consists in presuming, as has sometimes been done, that experiments conducted under artificial conditions yield the same results when they are repeated under natural conditions. It is quite true that when ducks are confined in an artificial tank and mosquito larvae are let in there, the latter are eaten up by the former. Perhaps under the circumstances the hungry ducks have no option ; either they must devour the mosquito larvae or die of starvation. But what is important for our purpose is to know whether, under natural conditions ducks take any note of the lowly larvae when they can feed themselves on bigger and more substantial prey. It is often found that large sized fish are not of much use as larvicidal agents, perhaps because they prefer to feed themselves on organisms which are comparatively much larger than mosquito larvae, such as small fish, etc. If then ducks imitate these big fish in letting the mosquito larvae severely alone when bigger and more substantial prey is available, the results are not surprising.

Quininisation.

The three Malaria dispensaries, one each at Royapuram, Purasawakam and Dhobipet continued working throughout the year, and the number of patients treated in these is shown in the following table :

TABLE 10.

	Year.	Total number of treatments.
Dispensaries	1916 ...	34,991
Do	1915 ...	44,652

The six Malaria nurses were retained for out-door distribution of quinine and the number of patients attended to by them is shown in Table 11.

TABLE 11.

	Year.	Total number of treatments.
Nurses	1916 ...	44,256
Do	1915 ...	74,633

Much was expected from the Malaria nurses when the scheme was originally started ; but from several causes, not the least important among which was the fact that they were not qualified medical women, they did not succeed in infusing confidence among those for whom they were working. The results of the scheme were rather disappointing. The Malaria dispensaries, however, have been throughout serving very useful purpose. In addition to their routine hospital work, the Sub-Assistant Surgeons took blood smears from patients attending the dispensaries for fever, which were examined in the Laboratory, and I am glad to testify to the good work turned out by the three Sub-Assistant Surgeons.

A good deal of controversy has raged, of recent years, round the question of quininisation as an Anti-malarial measure. One school for Malariologists pin their faith in measures directed against ‘ the mosquito carrier ’ and assert that quininisation is, at best, of secondary importance only ; while another school swear by quinine and assert that the only effective way of preventing Malaria is by the proper quininisation of “ the human-carrier.” But controversies apart, the safest course seems to lie midway between the two

extreme modes of thought and so far as the anti-malarial operations in Madras are concerned, we follow this middle path. We direct our campaign against both the human and the mosquito carrier. In a land where the mosquito-malarial theory is yet a secret for the elect, where administration of quinine is sometimes incriminated as the cause of deafness, blindness, general debility and many other informity, and where people are often seen to shake their heads ominously when the prophylactic and curative powers of quinine are mentioned to them, it is by no means easy to push quininisation to an extent which the supporters of quininisation school would desire us to do. But, as a measure of temporary utility quininisation is undoubtedly of great value, and in Madras, it is employed as much as possible.

Drainage.

In my report for 1915 I said that a scheme for draining swamps in Purasawakam was under preparation. The preliminaries were all completed, work was executed during the year under review, and a large and extensive marshy tank to the south of Straham's Road and north of Kosapet in Purasawakam has been drained. This drainage work has been supplemented by reclamation, and it may fairly be claimed that in this direction tangible and striking success has been achieved.

Reclamation.

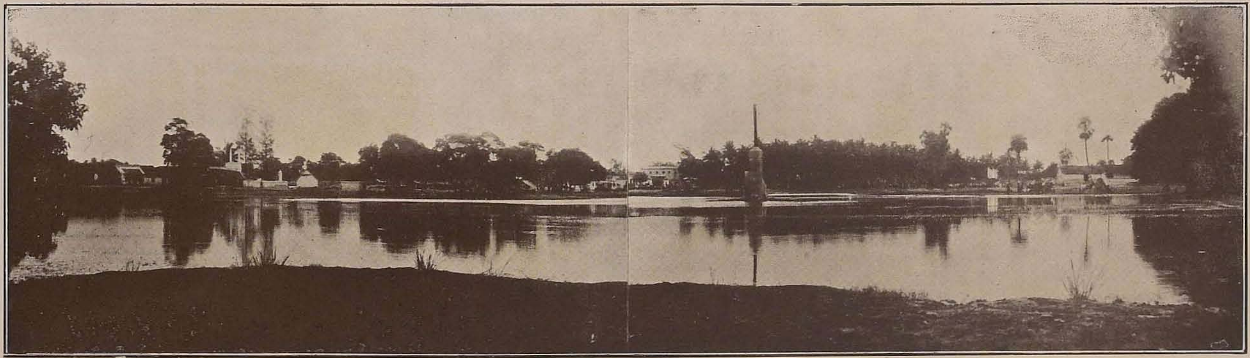
Constituting as it does one of the most efficacious of our anti-malarial measures, reclamation is being steadily pushed on notwithstanding the great difficulties associated with the carrying on of such work in the City of Madras. Some of these difficulties were detailed in my previous reports and they are as follows :—

1. In Madras the possibility of securing earth for reclamation work at a reasonable and fair price appears to be problematical. The foreshore along the sandy beach and the banks of the Buckingham Canal may at first sight strike one as affording an unending supply ; but the cost of transhipping the same for large works of reclamation and at long distances are well nigh prohibitive. Moreover from the way in which the demand for sand in Madras is increasing, it appears that the sandy beach may become so thickly riddled with deep pits, dry in summer and full and stagnant after the monsoons, as to be a dangerous breeding ground on an extensive scale. To this danger I had drawn the attention of the authorities concerned.

2. In the beginning the work was conducted by means of carts drawn by bulls. Finding this costly, the Corporation purchased four motor lorries, and with these the work went on satisfactorily for sometime. When I took charge of the department all the four lorries were engaged in the work of transhipping earth, etc. About the middle of April 1915 two of these were placed at the disposal of the Health Department for carrying on the conservancy work of the city, as it was found that in certain congested parts of Madras, motor transhipment was more speedy and satisfactory than bullock-cart transhipment. Since then reclamation has been carried on by this department with only two lorries.

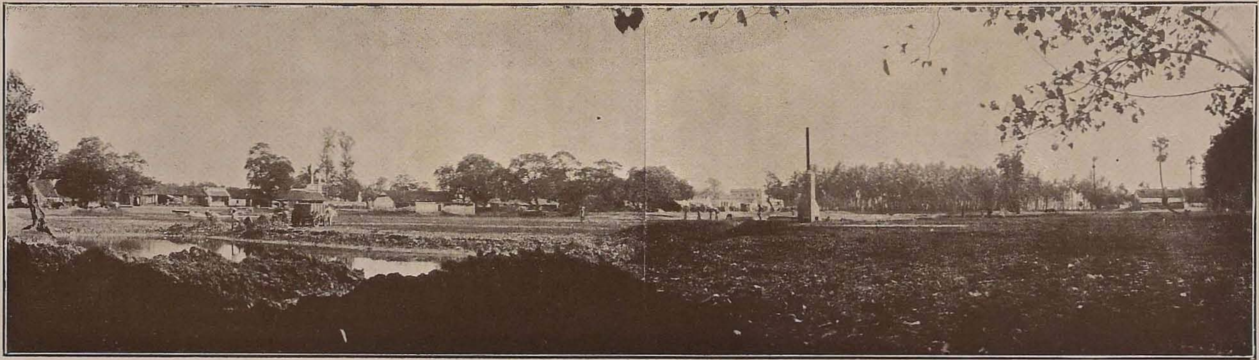
3. In some cases the cost of reclamation would mean spending a large amount over a land which will not be worth one tenth of the cost even at the best of times ; and this, no individual owner would willingly undertake.

In spite of these difficulties it is gratifying that much work of filling up pits, ponds and low-grounds was effected during the year, as the following table shows :—



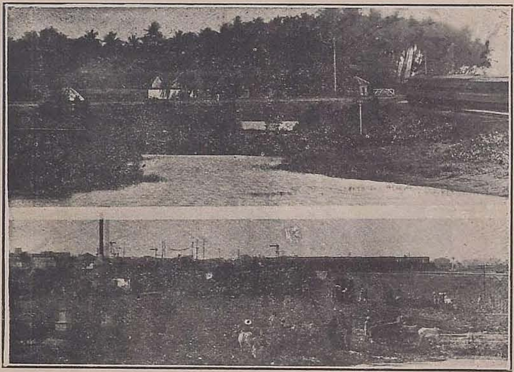
View before drainage operations were commenced.

ANTI-MALARIA DRAINAGE AND FILLING.—COMBINED OPERATIONS. Tanks off Strahan's Road drained by Special Works Department, undrainable portions filled with rubbish by Health Department.



View after drainage operations were completed. Filling of deep parts of tanks with rubbish in progress.

With the kind permission of Mr. J. W. MADELEY, Special Engineer, Corporation of Madras.



Reclamation by incinerated rubbish. (Washermanpet).

TABLE 12.

Serial No.	Division.	Place.	Owner's name.	Date of commencement.	Date of completion.
1	1	Tank ...	Parthasarathi Chetty ... Narayanaswamy Naidu ... Chengalani Naicker ... Genga Ammal ...	1-9-1916	30-11-1916
2	2	Do ...	Padmasini Ammal ...	2-2-1916	30-4-1916
3	2	Do ...	Singaravelu Gramany ...	1-7-1916	31-8-1916
4	2	Pit ...	Corporation of Madras ...	4-11-1916	11-11-1916
5	2	Do ...	Do ...	12-11-1916	19-12-1916
6	3	Tank ...	Veerappa Chetty ...	4-1-1916	31-5-1916
7	3	2 pits ...	Ramaswami Mudaliar and Kari Krishnan ...	1-3-1916	9-4-1916
8	3	Pit ...	Veeriah Chetty ...	20-8-1916	27-8 1916
9	3	Tank ...	Corporation burial ground ...	1 7-1916	31-7-1916
10	3	20 small and 3 big pits...	Do do opposite Kaka Thope ...	15-8-1916	25-8-1916
11	3	Wells ...	Corporation burial ground ...	4-7-1916	13-7-1916
12	3	Tank ...	Deputy Collector of Madras ...	7-10-1916	21-11-1916
13	3	Do ...	Madras Corporation ...	20-10-1916	25-12-1916
14	3	3 pits ...	Veeriah Chetty ...	21-10-1916	7-11-1916
15	3	Tank ...	Madras Corporation ...	26-8-1916	6-10-1916
16	8	Well ...	Papathi Ammal ...	16-12-1916	16-12-1916
17	10	Pit ...	Fathima Bee ...	15-3-1916	14-5-1916
18	11	Tank ...	Koravankulam ...	About 2 years ago.	21-6-1916
19	11	Do ...	In Sundaram Pillai Street ...	Do	21-4-1916
20	11	2 pits ...	Parthasarathy Mudaly ...	18-12-1916	31-12-1916
21	13	Lowland ...	Madras Corporation ...	20-2-1916	3-6-1916
22	13	6 pits ...	Namberumal Chetty ...	18-7-1916	10-8-1916
23	14	Tank ...	Messrs. Ponnu & Co. ...	18-7-1913	30-9-1916
24	15	Do ...	Mahomed Hug ...	1911	31-12-1916
25	19	Do ...	Hajee Naziruddin Sahib ...	1-2-1916	5-6- 916
26	19	Do ...	Rajoo Mudaly ...	1-3-1916	12-4-1916
27	19	Pit ...	Ethigiri Ammal ...	9-5-1916	29-5-1916
28	19	Tank ...	Sob Hazereth ...	25-8-1916	5-9-1916
29	19	Lowland ...	Ramaswamy Chetty ...	3-8-1916	10-9-1916
30	19	Pit and tank..	Papathi Ammal ...	1-11-1916	30-11-1916
31	20	Pit ...	Chlubvala of Royapuram ...	10-4-1916	17-7-1916
32	20	Do ...	Vittal Row ...	18-9-1916	31-12-1916

Table 13 gives details of earth work done under the supervision of the Special Malaria Department :—

TABLE 13.

Serial No.	Nature of place.	Owner.	Quantity of earth work.	Cost.		
			Cubic feet.	Rs.	A.	P.
1	Tank ...	The Society for the Protection of children ...	1,22,685	1,697	5	3
2	Do ...	Market Farm ...	96,000	2,014	0	8
3	Do ...	Robinson Park ...	1,34,400	1,319	12	0
4	Lowland ...	Dr. P. S. Chandrasekar ...	600	14	10	11
5	Tank ...	Mr. Y. V. Andrew ...	11,000	133	12	2
6	Do ...	Prince of Arcot ...	3,36,000	4,206	0	1
7	Do ...	Venugopal Naidu ...	2,22,074	3,021	10	10
8	Do ...	Rev. J. S M. Hooper, M.A. ..	72,056	1,065	3	4
9	Pond ...	Raju Mudaly ...	......	...	...	...*
10	2 tanks ...	Rev. Canon Smith ...	21,300	418	0	5
11	Lowland ..	Rao Bahadur A. Krishnaswamy Iyer ...	9,200	190	8	10
12	Pond ...	Hajee Naziruddin Sahib ...	......	...	...	...*
13	Pit ...	Ethigiri Ammal ...	......	...	...	...*
14	Tank ...	Justice K. Sreenivasa Iyengar ...	3,200	95	0	0
15	Well covering...	Trustees of Sree Parthasarathy Temple, Triplicane ...	......	51	13	2
16	Pond ...	Corporation of Madras ...	5,700	103	12	0

* These ponds were filled up by the conservancy carts. Hence the details are not given here.

Table 14 shows the list of places reclaimed by the owners themselves after notification and prosecution where necessary :—

TABLE 14.

Serial No.	Division.	Nature of place.	Owner.	Action taken.	Result.
1	2	Two wells.	Balasundaram Chetty ...	Notified ...	Filled up.
2	2	Four pits.	Narayanaswamy Naicker ...	Do. ...	Do.
3	2	Well.	Corporation of Madras ...	...	Covered.
4	3	Two wells.	Rangasayi Naidu ...	Notified ...	Filled up.
5	3	One pit.	Md. Meera Rowther ...	Do. ...	Do.
6	3	Two wells.	Krishnaswamy Mudaly ...	Do. ...	Do.
7	5	One well.	Ahmed Hussain Saheb ... Ethirajulu Chetty ... Aga Mohamed Kalel Shiraze ...	Do. ...	Do.
8	7	One well.	M.R.Ry. Sivagnana Mudaliar, Avl.	...	Covered.
9	10	Two pits.	Hakim Hajee Mohamed Abdul Aziz Sahib.	Notified ...	Filled up.
10	11	One pit.	Veeraya Chetty ...	Do. ...	Do.
11	11	One well.	Trustees of Chennakesavaperumal Koil.	Do. ...	Do.

TABLE 14—(*Contd.*).

Serial No.	Division.	Nature of place.	Owner.	Action taken.	Result.
12	11	One pit.	Velammal ...	Notified ...	Filled up.
13	11	One pit.	Sree Ramulu Naidu ...	Do. ...	Do.
14	11	One pit.	Seetharam Naidu ...	Do. ...	Do.
15	11	One pit.	Cannan Chetty ...	Do. ...	Do.
16	11	Four pits.	Basavalingam Chetty ...	Do. ...	Do.
17	11	One pit.	Chellapathi Naidu ...	Do. ...	Do.
18	11	One pit.	O. Munuswamy Mudaliar ...	Do. ...	Do.
19	11	One well.	S. M. Jaithee ..	Do. ...	Covered the mouth of the well.
20	11	Well.	Arumugam Pillai ...	Do. ...	Covered with mosquito wire gauze.
21	13	One pool.	Muthu Mudaliar ...	Do. ...	Filled up.
22	13	Tank.	H. M. Ziyauddin Sahib ...	Do. ...	Do.
23	13	Pit.	N. Ethirajulu Naidu ...	Fined ...	Do.
24	14	One pond.	Subramaniam Chetty ...	Notified ...	Do.
25	17	Well.	Rasool Khan Sahib ...	Do. ...	Do.
26	18	Well.	Parthasarathy Swami Temple ...	Letter ...	Covered.
27	19	Two pits.	Janaki Ammal ..	Notified ...	Filled up.
28	19	Two pits and three ditches.	Kuppuswamy Iyer and two others.	Do ...	Do.
29	19	Two wells.	Trustees of Pachiappa's charities.	Do. ...	Provided with picottah and in use.
30	19	One pit.	Rathnavelu Mudaliar ...	Do. ...	Filled up.
31	19	One pit.	Hajee Ahmed Sahib ...	Do. ...	Do.
32	19	One pit.	Mir Akbar Hussain ...	Do. ...	Do.
33	19	Three pits.	Gulam Haider Sahib ...	Do. ...	Do.
34	19	Well.	Kumaravelu Mudaly and Murugesa Mudaly.	Do. ...	Do.
35	19	Three pits.	Do. ...	Do. ...	Do.
36	19	Two wells.	Rajoo Gramany ...	Fined ...	Do.
37	19	Four pits.	Ramakrishna Laul ...	Notified ...	Do.
38	20	Well.	Saduddin Sahib ...	Do. ...	Do.
39	20	Pond.	Kasturi Ammal ...	Do. ...	Do.

Table 15 shows a list of places allowed to be cleaned by the owners themselves in lieu of notices requiring their being reclaimed.

TABLE 15.

Serial No.	Division.	Place.	Owner.	Work done.
1	11	Tank ...	Rudrakoti Pillai	Cleaned.
2	11	Do ..	Armugam Pillai	Do.
3	11	Well ..	Ponnuswamy Mudaliar and Sivasankara Mudaliar	Do.
4	17	Do ...	Gulam Mohideen Sahib	Do.
5	19	Do ...	Chellappa Naicker	Do.

There is one other point to be taken note of. Obviously it is impossible to insist on a private owner filling up a pond, pool, puddle, etc., if we are ourselves unable to fill up at his cost. He may be successfully prosecuted for disobeying our notice under section 302 and 303 of the Madras City Municipal Act, but under such circumstances, prosecution, I fear, is persecution and nothing more.

The Special Malaria Department and the Health Department are now in charge of a single Officer ; this of course, afforded me the best chance for trying the experiment of utilising the street rubbish collected by the Health Department for the reclamation work of the Special Malaria Department. As far as possible, I personally supervise the work, to see that no preventible nuisance is left unprevented. The spots selected for such works are at respectable distances from human habitations and wherever it is necessary to dump rubbish (burnt or screened) near human dwellings, such rubbish is immediately covered over with a sufficiently thick layer of earth. Where this is not possible the rubbish is screened, and the separated inflamable rubbish is heaped up in several parts over the area and burnt. The resulting ash and the screened material containing broken bricks, glass, pottery, etc., are spread evenly on the land.

While on this subject, it is just as well to mention a fact, which is not so well known as it should be and it is that the entire credit of inaugurating this scheme of using crude-rubbish for reclamation work in the city belongs to Major Ross, I.M.S., who, while he was the Health Offier of Madras, improved in this manner several plots of waste and unhealthy land in the various parts of this City.

Table 16 shows details of amounts realised from private owners towards the cost of work done for them departmentally :—

TABLE 16.

No.	Name of the owner.	Estimated cost.			Cost incurred by the Corporation.			Cost charged.			Cost recovered.			Remarks.
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
1	The Society for the Protection of Children. ...	...	...	...	1,697	5	3	...	...	..	...	..	...	*
2	Dr. P. S. Chandrasekar ...	...	...	...	14	10	11	14	10	11	14	10	11	
3	Mr. Y. V. Andrew...	...	...	...	133	12	2	133	12	2	133	12	2	
4	Prince of Arcot ...	2,000	0	0	4,206	0	1	2,000	0	0	1,500	0	0	
5	B. Venugopal Naidu	4,600	0	0	3,021	10	10	452	0	0	452	0	0	
6	Rev. J. S. M. Hooper	1,130	0	0	1,065	3	4	644	4	6	644	4	6	
7	Raju Mudaly ...	940	0	0	...	...	...	200	0	0	33	5	4	
8	Rev. Canon Smith.	630	0	0	418	0	5	400	0	0	400	0	0	
9	Rao Bahadur A. Krishnaswami Iyer	135	0	0	190	9	10	149	0	0	149	0	0	
10	Hajee Naziruddin Sahib ...	...	...	...	...	...	...	50	0	0	50	0	0	
11	Ethigiri Ammal ...	210	0	0	...	..	...	50	0	0	50	0	0	
12	Justice K. Srinivasa Iyengar ...	100	0	0	95	0	0	95	0	0	95	0	0	
13	Trustees of Sree Parthasarathy Swami Temple, Triplicane	...	...	...	51	13	2	51	13	2	51	13	2	Well covering.
14	Ponds in Government House Compound ...	...	...	...	92	12	8	92	12	8	92	12	8	Cleaning.
15	United Free Church Mission Boarding and Training School, Royapuram.	...	...	...	4	6	10	4	6	10	4	6	10	

* This money was not recovered as the property is utilized for charitable purposes.

Table 17 shows a list of cases where the cost could only be recovered through a Court of Law.

TABLE 17.

Serial No.	Name.	Amount sued for. Rs.	A.	P.	Court order.	Result.
1	Mr. Kannappa Mudaliar ...	109	12	5	Court decreed for the full amount with cost.	The party has paid the amount on 21-12-15 under protest.
2	Mohammad Ali Shah ...	171	15	9	Do. The party was asked to pay by monthly instalments of Rs. 7 per mensem commencing from 15-10-16.	The party is paying at Rs. 7 per mensem regularly.
3	Amthur Gaffor Gaffoor Unisa Begam Sahiba ...	528	11	0	Court decreed for the full amount with cost and the party was asked to pay by monthly instalments of Rs. 20.	The party is paying at the rate of Rs. 20 per mensem regularly.
4	Mr. K. Ramachandra Iyer, B.A., B.L.	289	6	0	The party came for terms before the case was called for hearing.	The President has shown a concession and recovered only Rs. 231-8-0 with half costs.
5	Mr. Singaravelu Gramany ...	18	0	0	..	The party paid the full amount with half cost before the case was heard.
6	Gopalakrishna Pillai ..	54	0	0	Court decreed for the full amount with costs.	Execution proceedings are being taken against the party.

Table 18 shows the number of places yet to be reclaimed. In a number of these cases the owners were successfully prosecuted and it is now open to us to reclaim the areas, at the owner's expense.

TABLE 18.

Serial No.	Division.	Place.	Owner.	Action taken.
1	3	Tanks ...	Hussain Sahib ...	Fined.
2	11	Tank ...	Rajagopalabhupathy ...	Do.
3	11	Pool ...	Venkatapathy Naidu ...	Do.
4	12	Tank ...	Hony. Secretary, Doveton Protestant College.	Not yet filled up; under correspondence since 1913
5	13	Pond ...	Ranganadha Naidu ...	Fined.
6	20	Pits ...	Valli Ammal ...	Do.

In my report for 1915 I made out a list of places under the charge of the Public Works Department, Military Authorities and Collector of Madras, requiring reclamation and I detail below how each case has been dealt with.

1. A large number of pits in and around Mulakuthalam in Cochrane Basin Road. These were filled up by the Corporation.

2. A large tank near the sepoy lines in Barracks Road belonging to the Military Authorities. This is a very big tank. Filling seems impracticable. Instead of spending thousands in filling it, it is desirable to conserve and periodically clean the tank, keeping the edges neat and trim.

3. An extensive low-land near the Record Office. This matter is still under correspondence.

4. Otary Nullah: At present the greater part of the channel gets silted up, when it is more a long and stagnant pool rather than a running channel.

5. Excavation of pits along the foreshore of the beach between the Napier's Bridge and the San Thome Cathedral. During the heavy storm in October last, the majority of these were levelled up and the Engineer reports that orders have issued to excavate sand near the sea margin and not to create irregular pits.

6. A large marshy tract on the sandy beach to the east of the Spring Haven Road and north-east of the Fort. The matter is still under correspondence. Even the ownership of this land is not yet definitely decided.

7. One tank in the Government Muslim Hostel in Mount Road. Nothing done.

8. Tank in Victoria Hostel. Nothing done.

9. Tanks in Chepauk: One tank near the Office of the Director of Agriculture was once cleaned and it may with advantage be drained and reclaimed.

10. One tank in the Government House Compound near the western side of the servants' line. Estimates are prepared by the Public Works Department for filling this up.

11. The ditch or drain intended to carry the overflow from Royapettah High Road into the Buckingham Canal. This has just been levelled up by the Public Works Department, and the pits and other irregularities in the bed of the channel are filled up.

12. Tank in Ritherdon Road, Vepery. This matter is still under correspondence.

13. The Old Moat behind the wall in Wall Tax Road in the premises of the Central Salt Depot. A Committee appointed to consider this question have prepared a scheme of reclamation and work is just about to commence.

14. Railway burrow-pits near Perambur, Washermanpet, etc. The Malaria Board recommended that "the attention of the Railway Authorities may be drawn to the numerous burrow-pits in Perambur and they may be advised to fill them or drain them in their own interest." Government in their order No. 141, M., of 26th January 1917 say that orders will issue in the Public Works Department on the recommendations of the Malaria Board in regard to the Railway burrow-pits in Perambur.

15. Pond to the north of Wharf office and west of Mulakuthalam: This has been partly filled up by the Public Works Department and on a reference from me for further filling, the Executive Engineer (Chingleput Division), who is in charge of this place informs me that the reclamation of the said pond will be completed before the next rainy weather.

STATISTICS.

Tondiarpet (1st, 2nd and 3rd Divisions).

Total No. of treatments, in	...	1916	50,362		
Do	...	1915	70,527		
Fresh infections	...	1916	5,742		
Do	...	1915	6,597		
Total deaths	...	1916	2,855	37·5	per mille.
Do	...	1915	3,384	44·5	
Average for ten years	...	...	4,319	56·8	
Fever deaths	...	1916	310	4.1	
Do	...	1915	813	10·7	
Average for ten years	...	...	1,001	13·2	
Infantile deaths	...	1916	891	262·5	per 1,000 births registered.
Do	...	1915	894	327·6	
Average for ten years	...	...	1,090	368·1	

Purasawakam (11th Division).

Total No. of treatments, in	...	1916	24,332		
Do	...	1915	39,800		
Fresh infections	...	1916	1,975		
Do	...	1915	2,319		
Total deaths	...	1916	1,418	34·1	per mille.
Do	...	1915	1,413	34·0	
Average for ten years	...	...	1,703	41·0	
Fever deaths	...	1916	128	3·1	
Do	...	1915	175	4·2	
Average for ten years	...	...	302	7·3	
Infantile deaths	...	1916	481	251·3	per 1,000 births registered.
Do	...	1915	431	269·8	
Average for ten years	...	...	487	262·0	

Mylapore (19th Division).

Total No. of treatments, in	...	1916	4,553		
Do	...	1915	9,958		
Fresh infections	...	1916	1,064		
Do	...	1915	2,316		
Total deaths	...	1916	1,272	37·0	per mille.
Do	...	1915	1,231	35·8	
Average for ten years	...	...	1,210	35·2	
Fever deaths	...	1916	46	1·3	
Do	...	1915	83	2·4	
Average for ten years	...	...	212	6·2	
Infantile deaths	...	1916	428	293·4	per 1,000 births registered.
Do	...	1915	331	253·8	
Average for ten years	...		352	306·6	

TABLE 19.

Statement showing the malaria cases treated both out-patients and in-patients in the several medical institutions in the City of Madras for 1914, 1915 and 1916.

Serial No.	Name of the Institutions.	1916		1915		1914	
		O. P.	I. P.	O. P.	I. P.	O. P.	I. P.
1	Govt. General Hospital.	7,005	490	8,456	365	8,423	695
2	Govt. Opthalmic Hospital	2	1	3	1	2	1
3	Govt. Leper Hospital.	...	...	...	...	...	...
4	II District Dispensary.	4	...	16	...	19	...
5	Royapettah Hospital ...	2,584	178	3,112	105	6,725	303
6	Tuberculosis Institute.	4	...	Not opened.			
7	Bauliah Naidu Dispensary	2,227	...	4,036	...	7,508	...
8	Chintadripet Dispensary.	2,079	...	1,733	..	3,433	...
9	Washermanpet Dispensary	3,425	...	6,955	...	6,925	...
10	Malaria Dispensary Purasawakkam ...	5,551	...	8,767	...	Not opened.	
11	Govt. Hospital Royapuram	3,755	78	...	...	...	...
12	Native Infirmary ...	...	...	...	111	...	252
13	Georgetown Dispensary	...	...	6,560	...	8,316	...
14	San Thome Dispensary.	339	...	458	...	1,071	...
15	Port and Marine Surgeon ...	23	...	44	...	71	...
16	Govt. Maternity Hospital	276	27	436	35	796	127
17	Govt. Vol. Ven. Hospital	..	...	...	...	...	...
18	V. C. & Gosha Hospital	578	99	530	45	786	110
19	Rajah Sir Ramaswamy Mudaliar's Lying-in-Hospital ...	137	46	186	28	191	9
20	Kalyani Hospital ...	44	4	Not received.			
21	Tondiarpet Rainy Hospital	672	...	Do.			
22	San Thome Convent Dispensary ...	...	...	...	...	...	...
	Total ...	28,705	923	41,292	690	44,066	1,497
	Combined Total ...	29,628		41,982		45,563	

The above figures speak for themselves ; alike from the returns of the several hospitals of the City and of our own Malaria Dispensaries, the fact seems obvious that Malaria is steadily going down in Madras. It is to be noted that Infantile mortality has not declined *pari pasu* with the decline in fever mortality and the number of patients treated for Malaria. The explanation for this phenomenon lies perhaps in the fact that the epidemic of Small-pox from which Madras suffered during the year under review, is responsible for some increase in mortality rates.

K. RAGHAVENDRA RAO,

B.A., M.B., & C.M.,

Special Malaria Officer C. M.

APPENDIX II.

Tondiarpet (1*st*, 2*nd and* 3*rd Divisions of Madras*).

—	Year.	Jany.	Febry.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Total number of treatments	1916	4,535	4,076	4,391	3,956	4,784	3,743	3,854	4,470	4,177	4,076	4,148	4,152	50,362
Do	1915	8,913	8,622	6,987	5,107	5,023	4,121	5,004	5,163	5,875	5,499	5,112	5,101	70,527
Fresh infections	1916	535	460	404	359	486	291	421	561	548	501	635	541	5,742
Do	1915	595	535	518	446	469	480	521	628	637	599	564	605	6,597
Total deaths during	1916	280	250	274	242	235	178	226	245	236	238	200	251	2,855
Do	1915	355	290	417	260	224	231	218	310	361	240	195	283	3,304
Average for ten years	...	381	320	337	278	284	283	339	457	441	411	378	410	4,319
Fever deaths during	1916	57	25	29	30	14	9	24	29	27	21	15	30	310
Do	1915	86	73	118	91	59	54	42	65	71	59	39	56	813
Average for ten years	...	87	75	87	69	79	67	73	96	104	89	82	93	1,001
Infantile deaths during	1916	62	61	69	84	84	47	88	80	90	76	80	70	891
Do	1915	113	84	95	60	55	69	66	87	89	47	56	73	894
Average for ten years	..	107	82	75	74	90	85	89	108	90	95	95	100	1,090

Purasawakam (11th Division).

—	Year.	Jany.	Feby.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Total number of treatments	1916	2,308	2,035	2,070	2,084	2,079	1,658	1,602	2,367	2,486	1,890	1,845	1,910	24,332
Do	1915	4,561	4,688	4,237	3,875	2,735	3,129	3,074	2,984	2,835	3,102	2,292	2,288	39,800
Fresh infections	1916	192	139	177	136	137	118	131	166	275	190	177	137	1,975
Do	1915	260	221	154	200	151	228	231	445	175	159	168	227	2,319
Total deaths during	1916	131	138	122	118	119	95	129	139	96	109	110	112	1,418
Do	1915	125	109	158	97	105	106	101	136	161	89	95	131	1,418
Average for ten years	...	157	136	130	122	130	120	134	170	173	156	124	151	1,703
Fever deaths during	1916	14	13	11	13	10	11	12	8	10	9	9	8	128
Do	1915	15	9	25	16	17	8	10	14	20	8	13	20	175
Average for ten years	...	26	23	26	22	23	23	24	28	29	26	22	30	302
Infantile deaths	1916	52	36	30	33	43	26	53	50	36	42	42	38	481
Do	1915	40	28	43	27	23	27	37	46	50	24	39	47	431
Average for ten years	...	43	33	36	39	42	36	40	43	42	46	38	49	487

Mylapore (19*th Division*).

—	Year.	Jany.	Feby.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Total number of treatments	1916	354	492	398	323	296	255	363	417	487	384	437	347	4,553
Do	1915	1,906	1,622	867	564	527	637	706	861	768	594	359	547	9,958
Fresh infections	1916	89	143	85	60	48	51	78	91	107	97	113	102	1,064
Do	1915	323	230	79	44	27	96	244	319	315	232	172	235	2,316
Total deaths during	1916	130	154	138	110	118	93	95	97	78	83	85	91	1,272
Do	1915	103	94	134	88	94	98	112	98	121	94	88	107	1,281
Average for ten years	...	109	92	90	95	92	86	97	107	112	122	99	109	1,210
Fever deaths during	1916	4	5	5	3	2	3	3	4	4	4	4	5	46
Do	1915	5	13	9	6	10	7	5	5	5	5	3	10	83
Average for ten years	...	19	17	18	16	17	17	17	17	20	20	18	16	212
Infantile deaths during	1916	43	40	42	42	43	31	32	38	22	33	31	31	428
Do	1915	34	25	31	27	21	21	31	29	35	25	26	26	331
Average for ten years	...	33	23	21	26	26	25	28	32	33	40	29	33	352

K. RAGHAVENDRA RAO, B.A., M.B. & C.M.,
Special Malaria Officer.

APPENDIX II.

Statement showing the expenditure under various headings for the year 1916.

Months.	Establishment.			Amount spent for filling, cost of petrol, repairing charges, to lorries for Anti Malarial Reclamation work.	Oiling, cleaning, Fishermen, bush-cutting and purchase of liquid fuel.	Stationery, Printing and Laboratory equipments.	Contingencies and rent of buildings, etc.	Grass Farm.	Total.
	Investigation, Prevention, Treatment and Lorry Staff.	Lorry Staff for Conservancy work and repairs thereof.	Engineering Staff.						
1	2	3	4	5	6	7	8	9	10
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
January ..	2,085 12 10	480 15 8	1,577 7 0	1,255 13 0	1,166 7 3	Nil.	264 2 0	3,492 14 1	10,323 7 10
February ...	2,012 0 0	487 13 8	1,588 1 1	1,697 12 0	1,287 2 6	11 1 3	189 14 11	2,530 4 10	9,804 12 3
March ...	2,304 15 2	933 7 6	1,736 6 8	1,175 13 2	1,890 3 7	Nil.	969 5 4	127 12 3	9,137 15 8
April ...	1,634 3 0	Nil.	2,049 3 2	1,343 8 0	870 7 3	Nil.	65 7 0	Nil.	5,962 12 5
May ...	1,726 3 2	Nil.	Nil.	1,327 7 0	858 11 1	62 3 0	100 4 6	Nil.	4,074 12 9
June	1,737 0 0	Nil.	Nil.	1,031 7 0	682 14 10	Nil.	91 2 9	Nil.	3,542 8 7
July ...	1,735 6 9	Nil.	69 9 7	326 12 0	720 3 0	221 1 8	86 9 0	Nil.	3,159 10 0
August ...	1,806 5 6	Nil.	41 9 9	214 8 0	725 3 10	4 14 2	301 12 4	Nil.	3,094 5 7
September ..	1,774 5 9	Nil.	26 3 1	954 3 0	739 10 10	6 6 11	215 3 6	Nil.	3,716 1 4
October ...	1,938 15 8	Nil	1,749 11 11	234 6 0	749 5 4	97 13 9	436 14 0	Nil.	5,197 2 8
November ...	1,767 9 4	Nil.	1,426 10 5	70 8 0	885 13 3	135 6 8	565 8 5	Nil.	4,851 8 1
December ...	1,772 1 8	Nil.	506 4 8	434 6 0	752 11 10	10 12 9	1,001 6 11	Nil.	4,477 11 10
Total ..	22,294 14 10	1,902 4 10	10,771 3 7	10,056 7 2	11,328 14 7	549 12 2	4,287 10 8	6,150 15 2	67,342 3 0

K. RAGHAVENDRA RAO, B.A., M.B & C.M.,

Special Malaria Officer, C.M.

Statement showing the tanks re-cleaned during the year 1916.

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
				George Town.				
1	24	1	2686	...	...	...	1	1
2	45	1	4977	...	...	...	1	1
				Tondiarpet (1st, 2nd and 3rd Divisions).				
3	5	1	95	1	...	2	2	5
4	,,	2	96	1	...	2	2	5
5	6-B	1	118	1	...	2	2	5
6	13-B	1	509	1	...	2	2	5
7	9-A	1	267	...	...	2	2	4
8	49	1	3307	2	2	3	3	10
9	,,	2	3303	1	...	3	2	6
10	,,	2-A	3303	1	...	3	2	6
11	46-A	1	3057	1	...	3	2	6
12	50-A	1	3465	1	...	2	2	5
13	50-B	2	3464	1	...	2	2	5
14	,,	3	3464	1	...	2	2	5
15	51-A	1	3482	1	...	2	2	5
16	,,	2	3482	1	...	2	2	5
17	,,	3	3482	1	...	...	...	1
18	51-B	1	3480	1	...	2	2	5
19	,,	2	3478	1	...	2	2	5
20	,,	3	3477	1	...	2	2	5
21	,,	4	3477	1	...	2	2	5
22	52-A	7	3522	1	...	2	2	5
23	52-C	1	3527	1	...	2	2	5
24	,,	2	3527	1	...	2	2	5

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd*).					
25	52-C	3	3527	1	...	2	2	5
26	41	2	2656	...	...	2	...	2
27	78	1	4059	1	...	2	1	[illegible]
28	,,	2	4059	1	...	2	1	4
29	,,	3	4061	1	...	2	1	4
30	,,	5	4062	1	...	2	1	4
31	,,	6	4062	1	...	2	1	4
32	,,	7	4058	1	...	2	1	4
33	,,	11	4063	1	...	2	1	4
34	79-B	2	4066	...	...	...	1	1
35	81-A	1	4310	1	...	2	1	4
36	81-B	3	4318	1	...	2	1	4
37	,,	4	4318	1	...	2	1	4
38	81-C	1	4310	1	...	2	1	4
39	,,	2	4313	1	...	2	1	4
40	81-D	1	4317	1	...	2	1	4
41	,,	2	4319	1	...	2	1	4
42	,,	5	4317	1	...	2	1	4
43	8[illegible]-B	1	4290	1	...	2	1	4
44	53-A	1	3541	1	...	2	1	4
45	,,	2	3541	1	...	2	1	4
46	,,	3	3537	1	...	2	1	4
47	,,	4	3535	1	...	2	1	4
48	,,	5	3535	1	...	2	1	4
49	,,	6	3536	1	...	2	1	4
50	,,	7	3537	1	...	2	1	4
51	,,	8	3541	1	...	2	1	4

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd*).					
52	53-A	9	3537	1	...	2	1	4
53	„	10	3547	...	1	...	...	1
54	„	11	3632	1	...	2	1	4
55	53-B	2	3547	...	1	2	1	4
56	„	3	3546	1	1	2	1	5
57	„	4	3547	...	1	2	1	4
58	53-C	1	3530	1	...	2	1	4
59	„	2	3532	1	...	2	1	4
60	„	4	3547	...	1	2	1	4
61	„	5	3547	...	...	2	1	3
62	54-A	1	3659	1	...	2	1	4
63	„	2	3660	1	...	2	1	4
64	54-B	2	3618	1	...	2	1	4
65	55-A	1	3667	...	...	2	1	3
66	„	4	3721	...	...	2	1	3
67	„	5	3721	...	...	2	1	3
68	„	6	3667	...	...	2	1	3
69	55-B	1	3667	...	...	2	1	3
70	„	2	3713	1	...	2	1	4
71	45-A	1	2996	1	1	2	1	5
72	„	4	3053	1	1	2	1	5
73	„	5	3053	1	1	2	1	5
74	45-B	1	2993	1	1	2	1	5
75	„	3	3040	1	1	2	1	5
76	„	4	3015	1	1	2	1	5
77	„	5	3015	1	1	2	1	5
78	17-A	1	1009	1	1	2	1	5

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No of times cleaned.	4th quarter. No of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd*).					
79	19-E	1	1088	1	1	2	1	5
80	26-A	1	1760	...	...	2	1	3
81	3	1	29	3	3	3	3	12
82	28-A	1	1802/1	1	...	3	2	6
83	,,	2	1802/1	1	1	3	...	5
84	,,	3	1802/1	1	...	...	2	3
85	,,	5	1802/1	1	...	...	...	1
86	28-B	1	1802	1	...	3	2	6
87	,,	2	1799	1	...	3	2	6
88	30	2	1828	1	1	3	2	7
89	,,	6	1827	...	..	3	2	5
90	,,	7	1827	1	...	3	2	6
91	,,	8	1827	1	...	3	2	6
92	,,	9	1824/2	1	...	3	2	6
93	,,	10	1824/2	1	...	3	2	6
94	,,	11	1824/2	1	...	3	2	6
95	,,	12	1824/2	1	...	3	2	6
96	,,	13	1824/3	1	...	3	2	6
97	,,	14	1824/3	1	...	3	2	6
98	34	1	1945	1	...	3	2	6
99	27-A	1	1767	1	...	...	...	1
100	,,	2	1790	1	...	3	2	6
101	,,	3	1795	1	1	...	...	2
102	,,	5	1791	...	...	3	2	5
103	,,	1	1791	1	...	...	...	1
104	,,	3	1766/1	1	...	...	...	1
105	,,	1 pond	1791	1	...	...	...	1

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter.	2nd quarter.	3rd quarter.	4th qnarter.	Total No. of times cleaned for the whole year.
				No of times cleaned.	No. of times cleaned.	No. of times cleaned.	No, of times cleaned.	
				Tondiarpet (1st, 2nd and 3rd Dns).—(*Contd*).				
106	27-A	4	1791	1	...	...	...	1
107	,,	5	1791	1	...	...	...	1
108	27-B	2	1766	1	...	3	2	6
109	36-A	1	2082	1	...	3	2	6
110	,,	2	2081	1	...	3	2	6
111	38-A	1	2385/1	1	...	3	3	7
112	36-B	1	2080	...	...	3	2	5
113	,,	2	2081	...	...	3	2	5
114	33-A	9	1890	1	...	3	2	6
115	,,	11	1879	...	...	3	2	5
116	,,	13	1863	...	...	3	2	5
117	,,	14	1869	1	...	3	2	6
118	,,	15	1890	...	...	3	2	5
119	,,	18	1879	...	...	3	2	5
120	33-B	1	1866	1	...	3	2	6
121	33-B	3	1867	1	...	3	2	6
122	,,	4	1868	1	...	3	2	6
123	,,	5	1876	1	...	3	2	6
124	,,	7	1872	1	...	3	2	6
125	,,	8	1880	...	...	3	2	5
126	33-C	1	1890	1	...	...	...	1
127	,,	1-D	1890	1	...	...	...	1
128	57-A	1	3801	...	1	3	3	7
129	,,	2	3799	...	1	3	3	7
130	,,	3	3880	...	1	3	3	7
131	,,	4	3789	...	1	3	3	7
132	57-B	1	3752	...	1	3	3	7

Serial No	Block No.	Tank No,	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd.*)					
133	57-B	2	3795	...	1	3	3	7
134	„	4	3793	...	1	3	3	7
135	„	5	3756	...	1	3	3	7
136	„	7	3763	...	1	3	3	7
137	58-A	1	3812	1	1	3	3	8
138	„	2	3311	1	1	3	3	8
139	„	3	3811	1	1	3	3	8
140	58-B	1	3810	1	1	3	3	8
141	„	2	3810	1	...	3	3	7
142	„	3	3809	1	...	3	3	7
143	„	4	3802	1	...	3	3	7
144	„	5	3808	1	...	3	3	7
145	„	6	3808	1	...	3	3	7
146	„	7	3805	1	...	3	3	7
147	„	8	3806	1	...	3	3	7
148	„	9	3807/1	1	...	3	3	7
149	„	11	3809	...	...	3	3	6
150	56-A	2	3734	...	1	3	3	7
151	„	3	3740	...	1	3	3	7
152	„	4	3741	...	1	3	3	7
153	„	5	3741	...	1	3	3	7
154	„	6	3738	...	1	3	3	7
155	„	7	3737	...	1	3	3	7
156	„	9	3735	...	1	3	3	7
157	56-B	1	3733	...	1	3	3	7
158	„	2	3733	...	1	3	3	7
159	„	3	3733	...	1	3	3	7

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. Number of times cleaned.	2nd quarter. Number of times cleaned.	3rd quarter. Number of times cleaned.	4th quarter. Number of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—*Contd.*					
160	56-B	4	3734	...	1	3	3	7
161	„	5	3734	...	1	3	3	7
162	59-B	1	3822	...	1	3	3	7
163	„	3	3821	...	1	1	1	3
164	„	6	3822	...	...	3	3	6
165	„	7	3822	...	1	3	3	7
166	59-D	2	3825	...	1	3	3	7
167	„	3	3825	1	1	3	3	8
168	„	4	3825	1	1	3	3	8
169	„	5	3826	...	1	3	3	7
170	„	6	3827	...	1	3	3	7
171	72-A	1	3899	...	1	3	3	7
172	„	2	3900	...	1	3	3	7
173	„	3	3900	...	1	3	3	7
174	„	4	3902	...	1	3	3	7
175	„	5	3902	...	1	3	3	7
176	„	6	3902	...	1	3	3	7
177	„	7	3905	...	1	3	3	7
178	„	8	3912/1	...	1	3	3	7
179	„	9	3912/1	...	1	3	3	7
180	„	10	3912	...	1	3	3	7
181	„	11	3912/3&4	...	1	3	3	7
182	„	12	3906	...	1	3	3	7
183	72-B	1	3934	...	1	3	3	7
184	„	2	3930	...	1	3	3	7
185	„	3	3936	...	1	3	3	7
186	„	4	3907	...	1	3	3	7

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd.*)					
187	72-B	5	3905	...	1	3	3	7
188	,,	6	3903	...	1	3	3	7
189	,,	7	3901	...	1	3	3	7
190	,,	8	3900	...	1	3	3	7
191	73	2	3941	...	1	3	3	7
192	,,	3	3941	...	1	3	3	7
193	,,	5	3941	...	1	3	3	7
194	,,	7	3941	...	1	3	3	7
195	,,	8	3939	...	1	3	3	7
196	,,	9	3939	...	1	3	3	7
197	,,	10	3939	...	1	3	3	7
198	,,	11	3938	...	1	3	3	7
199	,,	12	5937	...	1	3	3	7
200	,,	13	3936	...	1	3	3	7
201	,,	14	3940/C	...	1	3	3	7
202	,,	15	3940/B	...	1	3	3	7
203	,,	16	3937	...	1	3	3	7
204	,,	17	3937	...	1	3	3	7
205	74-A	2	3951	...	1	3	3	7
206	,,	3	3949	...	1	3	3	7
207	,,	4	3949	...	1	3	3	7
208	,,	5	3946	...	1	3	3	7
209	,,	6	3948	...	1	3	3	7
210	74-B	1	3946/1	...	...	3	2	5
211	,,	2	3946/2	...	1	3	2	6
212	,,	3	3944	...	1	3	2	6
213	,,	4	3944	...	1	3	2	6

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
		Tondiarpet (1st, 2nd and 3rd Dns)—(*Contd*).						
214	74-B	5	3945	...	1	3	2	6
215	„	6	3946	...	1	3	2	6
216	„	7	3945	...	1	3	3	7
217	„	8	3944	...	1	3	3	7
218	„	9	3943	...	1	3	3	7
219	75-A	1	3953	...	1	3	3	7
220	„	2	3953	...	1	3	3	7
221	„	3	3953	...	1	3	3	7
222	„	4	3953	...	1	3	3	7
223	„	5	3953	...	1	3	3	7
224	„	7	3955	...	1	3	3	7
225	„	8	3964	...	1	3	3	7
226	„	9	3967	1	1	3	3	8
227	„	11	3968	...	1	3	3	7
228	„	12	3969	...	1	3	3	7
229	„	13	3911	...	1	3	3	7
230	„	14	3920/2	...	1	3	3	7
231	75-B	1	3957	...	1	3	3	7
232	„	2	3955	...	1	3	3	7
233	„	4	3955	...	1	3	3	7
234	„	5	3957	...	1	3	3	7
235	„	6	3957	...	1	3	3	7
236	„	7	3958	...	1	3	3	7
237	76-A	1	3976	...	1	3	3	7
238	„	2	3973	...	1	3	3	7
239	„	3	3973	...	1	3	3	7
240	„	4	3972	...	1	3	3	7

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned	4th quarter. No, of times cleaned.	Total No. of times cleaned for the whole year.
		Tondiarpet (1st, 2nd and 3rd Dns.)—(*Contd*).						
241	76-A	5	3972	...	1	3	3	7
242	„	6	3972	...	1	3	3	7
243	„	7	3972	...	1	3	3	7
244	„	8	3933	...	1	3	3	7
245	„	9	3977	...	1	3	3	7
246	76-B	1	3977	...	1	3	3	7
247	„	2	3977	...	1	3	3	7
248	„	3	3977	...	1	3	3	7
249	„	4	3977	...	1	3	3	7
250	„	5	3978	...	1	3	3	7
251	„	6	3911	...	1	3	3	7
252	„	7	3911	...	1	3	3	7
253	„	8	3911	...	1	3	3	7
254	„	9	3911	...	1	3	3	7
255	77-A	1	4035	...	1	3	3	7
256	„	2	4035	...	1	3	3	7
257	„	3	4035	...	1	3	3	7
258	„	4	4034	...	1	3	3	7
259	„	5	4034	...	1	3	3	7
260	77-B	1	4052	...	1	3	3	7
261	„	2	4036	...	1	3	3	7
262	77-B	4	4035	...	1	3	3	7
263	„	5	4036	...	1	3	3	7
264	„	6	4033	...	1	3	3	7
265	„	6-A	4033	...	1	3	3	7
266	„	7	4056/3	...	1	3	3	7
267	„	9	4052/2	...	1	3	3	7

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times. cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd & 3rd Dns).—(*Contd*).					
268	77-B	10	4049	...	1	3	3	7
269	77-C	1	4040	...	1	...	...	1
270	„	2	4032	1	1	3	3	8
271	„	3	4033	...	1	3	3	7
272	„	5	4032	1	2	3	3	9
273	„	6	4033	...	1	3	3	7
274	„	7	4034	...	1	3	3	7
275	„	8	4037	...	2	3	3	8
276	„	9	4040	...	1	3	3	7
277	77-D	1	4048	...	1	3	3	7
278	„	2	4046	...	1	3	3	7
279	„	3	4038	...	1	3	3	7
280	„	4	4039	...	1	3	3	7
281	„	5	4040	...	1	3	3	7
282	„	6	4040	...	1	3	3	7
283	„	7	4043	...	1	3	3	7
284	68-B	1	3868	...	1	3	1	5
285	„	2	3869	...	1	3	1	5
286	69-B	2	3372	...	1	3	1	5
287	69-D	1	3873	...	1	3	1	5
288	„	2	3873	...	1	3	1	5
289	„	3	3873	...	1	3	1	5
290	70-C	2	3884	...	1	3	1	5
291	„	5	3883	...	1	3	1	5
292	„	6	3882	...	1	3	1	5
293	71-B	1	3892/6	...	1	3	1	5
294	„	2	3892/6	...	1	3	1	5

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Tondiarpet (1st, 2nd & 3rd Dns).—*(Contd).*					
295	71-B	3	3896	...	1	3	1	5
296	„	4	3896/6	...	1	3	1	5
297	71-D	2	3894	...	1	3	1	5
298	„	3	3897	...	...	3	1	4
299	„	4	3897	...	1	3	1	5
300	„	5	3882	...	...	3	1	4
301	„	6	3892	...	1	3	1	5
			Vepery Division.					
302	28	1	1269	3	3	3	3	12
303	„	1/C	1269	3	3	3	3	12
304	27-B	1	1268	3	3	3	3	12
305	„	2	1268	3	3	3	3	12
306	„	3	1268	3	3	3	3	12
307	27-A	1	1268	3	3	3	3	12
308	26-B	1	1267	3	3	3	3	12
309	15	1	660	1	...	2	...	3
310	8	1	49	1	...	...	...	1
311	17	2	668	1	...	...	...	1
			Purasawalkam Division.					
312	41-A	3	2765	2	...	...	...	2
313	„	2	2760	1	...	...	...	1
314	„	1	2762	2	1	...	...	3
315	„	2	2759	2	...	1	...	3
316	41-B	3	2774	1	...	...	...	1
317	„	1	2776	2	...	1	...	3

Serial No.	Block No.	Tank No.	R. S. No.	1st quarter. No. of times cleaned.	2nd quarter. No. of times cleaned.	3rd quarter. No. of times cleaned.	4th quarter. No. of times cleaned.	Total No. of times cleaned for the whole year.
			Purasawakam Division—(*Contd*).					
318	41-B	2	2776	2	...	1	...	3
319	37	1	2383	2	...	2	...	4
320	"	2	2355	2	...	2	...	4
321	"	3	2355	2	...	2	...	4
322	"	1	2355	2	...	2	...	4
323	"	2	2356	2	...	2	...	4
324	8	1	231	1	1	...	...	2
325	14-B	1	771	1	...	...	...	1
326	29	4	1859/1	1	...	...	...	1
327	34	1	49	1	...	...	...	1
328	46	1	2905	1	1	...	...	2
329	48	1	2932	1	...	...	...	1
330	44	2	2869	1	...	1	1	3
331	"	3	2859	1	...	1	1	3
332	"	1	2859	...	...	1	...	1
333	"	1	2859	...	...	1	...	1
334	Otary Nullah.			1	1	1	...	3
335	34	1	2556	...	1	...	...	1
336	25	4	1513	...	...	...	1	1
337	53	1	3118	...	..	1	...	1
338	2	1	20	...	...	...	1	1
339	"	2	22	...	...	...	1	1
340	"	3	25	...	...	...	1	1
341	1	1	2	...	...	...	1	1
342	"	2	2	...	...	...	1	1
343	13-B	1	742	...	...	...	1	1
344	51-A	6	3122	...	1	...	1	2

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			Purasawakam Division—(*Contd*).					
345	50	3	3111	...	...	...	1	1
346	"	4	3111	...	...	...	1	1
347	"	5	3111	...	...	...	1	1
348	52-B	2	3129	...	...	...	1	1
349	48	1	840	...	1	...	1	2
350	34	1	2200/2	...	...	1	1	2
			Perambur division.					
351	17	1	273	...	...	1	...	1
352	17-C	4	304	1	...	1	...	2
353	3-A	1	117	...	...	1	...	1
354	2	1	52	...	...	1	...	1
355	9	1	162	...	...	1	...	1
356	2	low land.	55	...	...	1	...	1
357	11	5	218	...	...	1	...	1
358	"	2	219	...	...	1	...	1
359	11	3	219	...	...	1	...	1
360	"	4	218	...	...	1	...	1
361	"	1	219	...	...	1	...	1
362	18-C	2	303	...	...	1	...	1
363	"	1	304	...	...	1	...	1
364	43	1	782	...	...	1	...	1
365	"	2	781	...	...	1	...	1
366	"	3	782	...	...	1	...	1
367	"	4	781	...	...	1	...	1
368	"	5	783	...	...	1	...	1

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				Perambur Division—(*Contd.*).				
369	44	1	786	...	...	1	...	1
370	,,	2	784	...	...	1	...	1
371	38	1	747	...	...	1	...	1
372	,,	2	747	...	...	1	...	1
373	,,	3	749	...	...	1	...	1
374	,,	4	749	...	...	1	...	1
375	28	1	561	...	...	1	...	1
376	29	1	659	...	...	1	...	1
377	26	2	501	...	...	1	...	1
378	,,	3	501	...	..	1	...	1
379	,,	4	503		...	1	...	1
380	,,	1	506	...	...	1	...	1
381	,,	2	506/1	...	...	1	...	1
382	35-A	1	728	...	...	1	...	1
383	35-B	1	727	...	...	1	...	1
384	21-A	1	349	...	...	1	...	1
385	,,	1	353	...	...	1	...	1
386	21-B	1	340	...	...	1	...	1
387	,,	2	339	...	...	1	...	1
388	,,	3	337	...	...	1	...	1
389	20	1	333	...	...	1	...	1
390	15-A	3	245/2	...	...	1	...	1
391	,,	1	248	...	...	1	...	1
392	,,	2	249	...	...	1	...	1
393	15-B	2	249	...	...	1	...	1
394	23-A	1	395	...	...	1	...	1
395	16-A	1	263	...	...	1	...	1

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				Perambur Division—(*Contd.*).				
396	16-A	2	264	...	...	1	...	1
397	„	3	262	...	...	1	...	1
398	„	1	263	...	...	1	...	1
399	„	2	264	...	...	1	...	1
400	16-B	1	265	...	...	1	...	1
401	„	1	266	...	...	1	...	1
402	„	2	267	...	...	1	...	1
403	„	3	268	...	...	1	...	1
404	20	1	331	...	...	1	...	1
				Mylapore Division.				
405	45-B	1	2295	...	1	...	...	1
406	35	3	1674	...	1	...	...	1
407	„	1	1693	...	1	...	1	2
408	„	2	1673	...	1	...	1	2
409	25-B	1	1157	...	1	...	1	2
410	4-C	1	69	...	1	...	1	2
411	4-A	2	67	...	1	...	1	2
412	23	1	1099	...	1	1	1	3
413	11	4	629	...	1	...	1	2
414	„	3	629	...	1	...	1	2
415	„	2	629	...	1	...	1	2
416	22	1	1063	...	1	1	1	3
417	15-B	1	826	...	1	...	1	2
418	21	1	1037	...	1	...	1	2
419	36	4	1724	...	1	...	1	2

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			Mylapore Division—*Contd.*					
420	36	9	1706	...	1	...	1	2
421	,,	5	1701	...	1	...	1	2
422	,,	8	1706	...	1	...	1	2
423	,,	3	1723	...	1	..	1	2
424	37-A	1	1731	...	1	..	1	2
425	,,	2	1734	...	1	...	1	2
426	66	1	3333	...	1	...	1	2
427	,,	2	3333	...	1	...	1	2
428	39	1	1925	...	1	...	1	2
429	20-B	1	1003	...	1	...	1	2
430	33	2	1595	...	1	...	1	2
431	,,	1	1594	...	1	...	1	2
432	24-A	1	1146	...	1	...	1	2
433	,,	2	1147	...	1	...	1	2
434	,,	3	1148	...	1	...	1	2
435	24-B	3	1130	...	1	...	1	2
436	25-C	1	1208	...	1	...	1	2
437	31-A	1	1566	...	...	...	1	1
438	31-B	2	1567	...	...	...	1	1
439	,,	3	1567	...	...	...	1	1
440	30-A	3	1548	...	...	...	1	1
441	30-B	3	1548	...	...	...	1	1
442	1-C	1	6	...	...	...	1	1
443	6-A	1	194	...	...	...	1	1
444	1-B	1	3	...	...	...	1	1
445	34-B	1	1654	...	...	...	1	1

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				Egmore Division.				
446	2	31	483	...	1	...	1	2
447	50-A	1	1605	...	1	...	1	2
448	,,	2	1605	...	1	...	1	2
449	26	lowland.	451/2	...	1	...	1	2
450	37	1	798	...	1	...	1	2
				Nungumbaukam Division.				
451	4	1	27	...	1	...	1	2
452	,,	2	27	...	1	...	1	2
453	3	1	24	...	...	...	1	1
454	,,	1	24	...	...	...	1	1
				Triplicane Division.				
455	12	1	357	...	1	1	...	2
456	30	1	1512	...	1	...	...	1
457	59-A	1	3171	...	1	...	...	1
458	59-B	2	3171	...	1	...	...	1
459	,,	3	3171	...	1	...	...	1
460	,,	5	3171	...	1	...	...	1
461	6-A	1	194	...	...	1	1	2

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